The NEW ZEALAND JOURNAL OF AGRICULTURE

Vol. 64. WELLINGTON, MAY 15, 1942. No. 5

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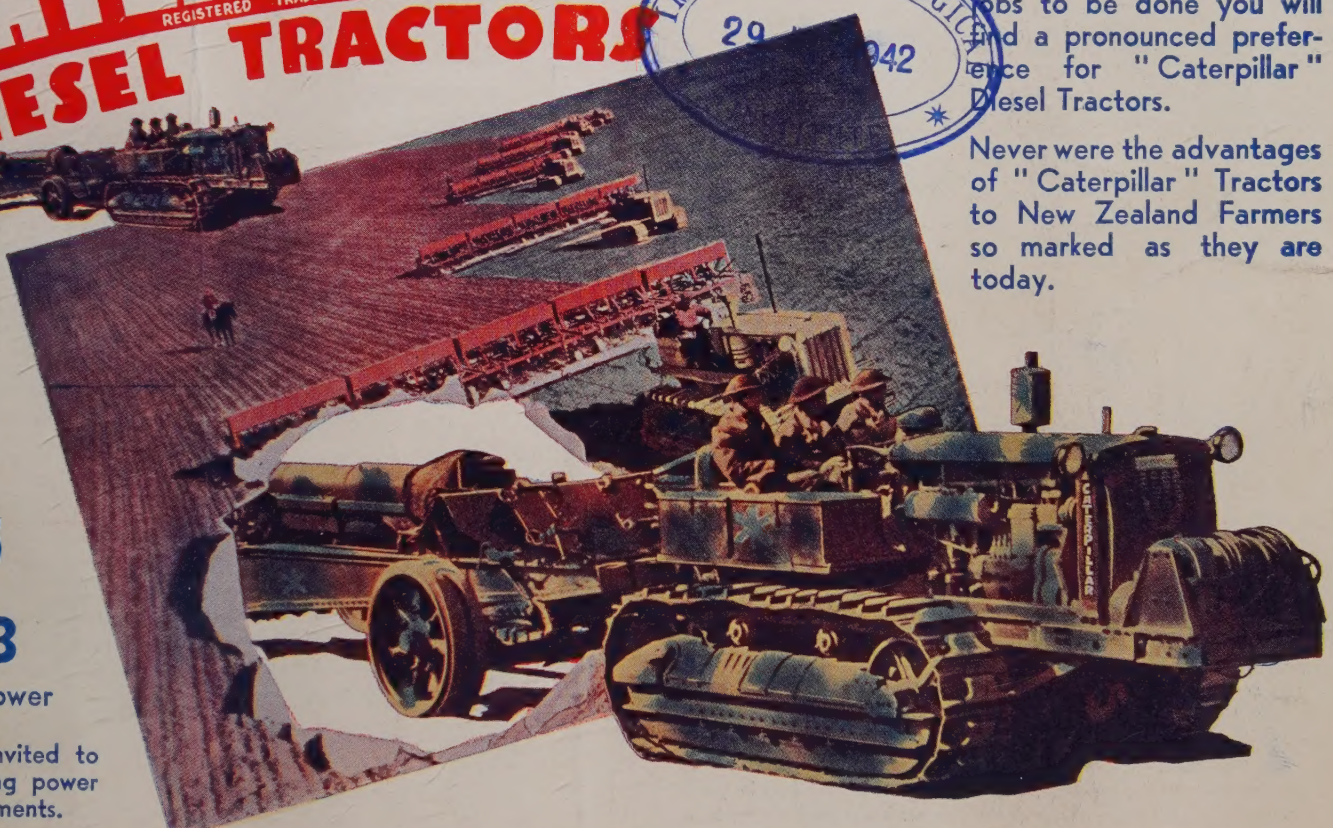

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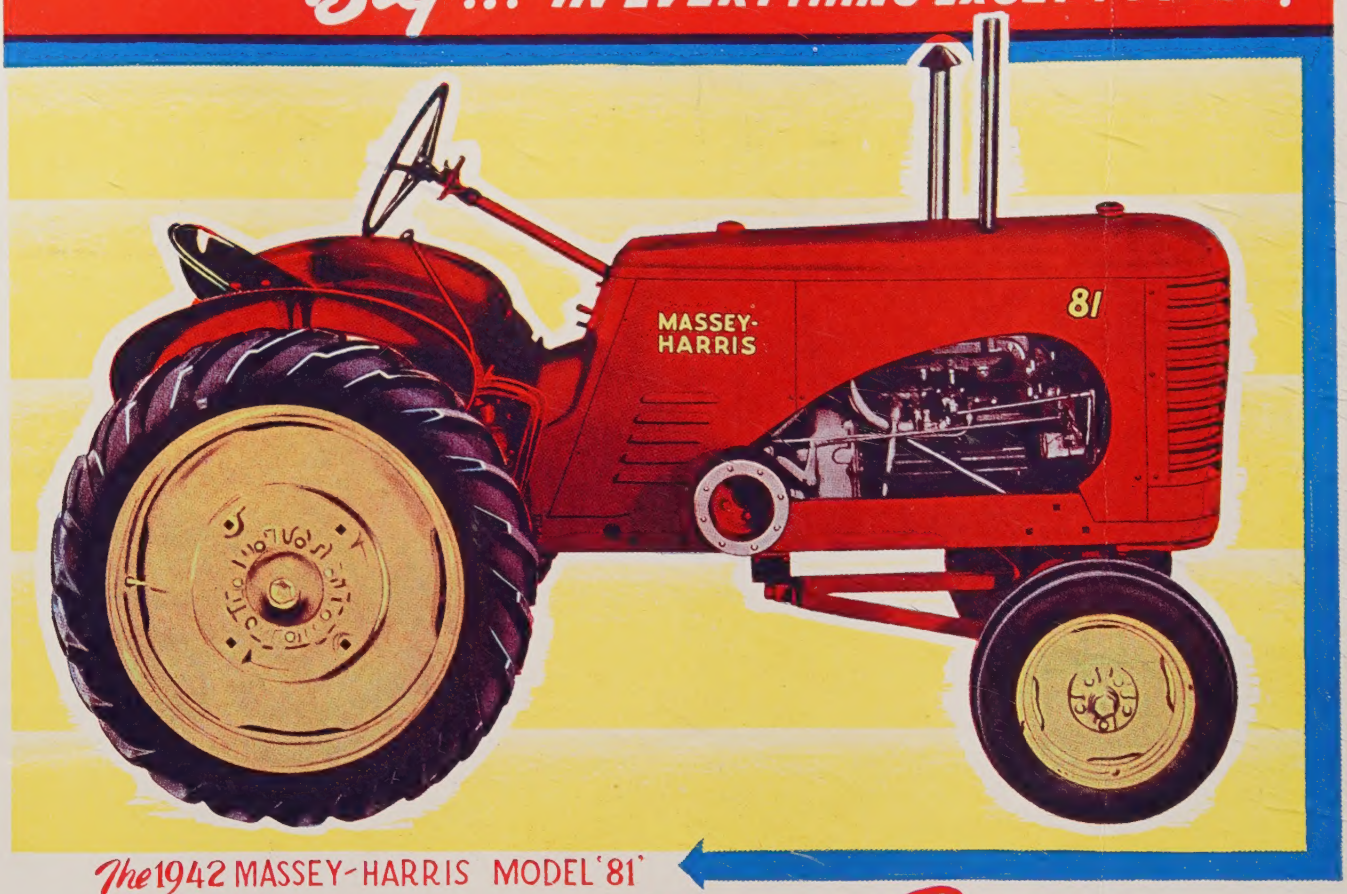

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THE NEW ZEALAND
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NEW ZEALAND SEEDS FOR BRITISH PASTURES

Possibilities of The Market

By
A. L. POOL, B.(For.), Sc. N.D.H. (N.Z.),

Before the war, the United Kingdom depended on the continent of Europe for a substantial part of her grass seed. Not only has this source of supply been cut off, but, as the result of a policy of pasture improvement, her need for imported seed is today greater than ever. There is an opportunity now for New Zealand to obtain a bigger share of the British market. This article indicates the classes of seed in demand, and the steps which are being taken to test the performance of New Zealand seeds under English conditions.

TO understand the herbage seed trade of New Zealand with Great Britain, it is first necessary to have a picture of the grassland position in England before the war and as it is now; and to have at the same time some idea of the relationship of this trade with the total herbage seed trade of Great Britain.

The grassland survey of England and Wales carried out by the Welsh Plant Breeding Station immediately before the war (William Davies—"The Grassland Map of England and Wales" in "Agriculture," September, 1941) showed that the total permanent pasture and rough grazings amounted to 21,319,000 acres. Of these only 251,000 (1.2 per cent.) consisted of first-grade pastures with a content of over 30 per cent. ryegrass, and 912,000 acres (4.4 per cent.) of second-grade pasture with a 15 per cent. to 30 per cent. ryegrass content. The greatest area of permanent grassland was occupied by 4,317,000 acres (20.2 per cent.) of *Agrostis* with 2 per cent. to 5 per cent. ryegrass, and 9,580,000 acres (45 per cent.) of ordinary *Agrostis* pastures. Both of these last two types can be considered as medium to poor pastures. The remainder of the area was taken up by fescue pastures, moor pastures, various types of pastures invaded by gorse and fern, most of which would be included under rough grazings, and much would be situated in country of high elevation.

First-hand acquaintance with British grasslands soon makes it obvious that the above position, from a production point of view, is far from satisfactory, for much of the area now under poor pasture can readily be made to support better herbage. To quote the writing of a New Zealand investigator in England before the outbreak of war. ". . . Farmers were not encouraged to utilise grassland to the extent possible in the light of scientific research. Although less spectacular than the soil erosion and scrub infestation of the Dominions, land deterioration, particularly from the neglect of drainage and maintenance of soil fertility, was widespread. Behind the screen of the incomparable attractiveness of the English countryside, there was another sight, the surprising extent of land abandoned, out of production, or devoid of productivity." (I. D. Blair, "Wartime Problems of English Agriculture," in "Agricultural History," January, 1941.)

Period of Decline

During the last war, as in this, much land was ploughed up for extra cropping but the agricultural situation

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deteriorated rapidly shortly after the war, and large areas were left to "fall" back into grass, or were sown with unsuitable mixtures. Thus for the past two decades at least British grassland has had neither the advantage of being sown down with good grasses nor that of being managed properly. There are, however, some restricted areas including parts of the Romney Marshes and the Leicestershire fattening pastures which have natural conditions enabling first-class pastures to be maintained with ease; they indeed do carry world-renowned pastures. Apart from them there are, here and there, cases of first-class grass farming which show what some of the land and climatic conditions are capable of producing.

In contrast to the marked deterioration of pasture lands during the period between the two wars, knowledge of the scientific management of grasslands progressed considerably and much of the fundamental work in this research was led by English institutions.

At the beginning of this war, with the sudden urgent call on primary production, there was therefore ample scope for increased production from the grasslands, and the knowledge to put it into operation was in existence. Because of the greater yield of direct human foods obtainable from arable land in comparison with pastures, attention was, however, turned immediately to ploughing up extra land for the growing of crops, and by 1942 approximately six million acres of extra arable land will have been ploughed up for this purpose. Grassland was still neglecetd, for after two decades of retrogressive farming, the potentialities of the grasslands were realised by few. The existing *Agrostis* pastures were commonly regarded as being the best that the soil and climate could produce. This attitude is fortunately being altered gradually.

Much of the first land to be ploughed for crops should go back to short or medium term leys, considering the limited supplies of fertilisers, and the necessity of maintaining fertility. The regrassing of this land, and the improvement of pastures generally, are of necessity coming much to the fore, and some of the counties are endeavouring to provide for it. One of the problems with which they will have to contend is the supply of seed, in particular good quality seed; for Great Britain, pre-war, was a heavy importer of seed from Europe, and she now has this source completely cut off.

Normal Source Of Seed

It is only within the last few years that British statistics have been so compiled that an accurate picture of the seed imports can be gained. During the years 1935-39 the following was approximately the position. (Figures quoted are from "The Trade of the United Kingdom"):—

Perennial Ryegrass.—Great Britain was normally almost self-supporting in this seed, as large quantities were produced in Ireland. Fair quantities were, however, imported from Denmark, and, when the Irish crop was poor, also from New Zealand.

The Irish and Danish commercial seed is not suitable for permanent pasture work, so that when seed firms and farmers realised the importance of good strains, New Zealand Certified, Aberystwyth strains, English indigenous, and strains bred by seed firms themselves came more and more to the fore. The quantity used, however, was still a small percentage of the whole. In an impoverished farming community, high seed prices were a major deterrent to the extended use of these improved grasses.

Italian Ryegrass.—This seed is used in Great Britain in very large quantities for temporary leys in arable rotations. The bulk of this seed, some 85 per cent., was produced in the United Kingdom and most of the remainder came from France and Denmark.

Price Factor

Cocksfoot.—The annual imports into Great Britain varied from 1700 tons to 2400 tons, and of these amounts about 85 per cent. came from Denmark and a certain amount from France and New Zealand. Formerly New Zealand supplied considerably more than she does now, and would undoubtedly do so again, provided the price could compete with Danish seed. The Danish seed produces open growing plants, good for haying, but lacking ability to stand up to hard grazing. New Zealand cocksfoot is preferred as it is more perennial and leafy in nature. Aberystwyth strains, a hay type, a pasture type, and an intermediate type, as well as other English-grown seed, were coming more and more on to the market, but they represented only a small percentage of the total quantity used. Price again was a deterrent to their more extended use.

Timothy.—This seed was imported largely from America and Canada, though fair amounts were produced in Scotland. The leafy Aberystwyth strains of Timothy were finding their way on to the market in small quantities.

Dogstail.—Most of the United Kingdom's requirements were grown in Ireland with New Zealand practically the only overseas source of supply. The extent of imports from New Zealand largely depended, therefore, upon the Irish crop, and over the past five years ranged from 29 tons 1cwt. to 224 tons 2cwt. Not all of this seed is used in pasture work, as a considerable quantity goes into lawn and playing field mixtures.

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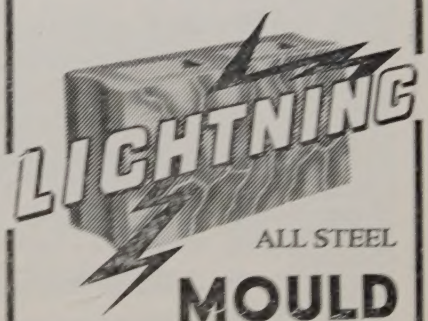

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White Clover.—About a half to two-thirds, amounting to 400 tons in 1939, of the requirements of white clover seed was imported. Of this amount about two-thirds came from mid-Europe—Germany, Poland, Hungary, and Czecho-Slovakia—and the remainder from the U.S.A., New Zealand, and Canada. Seed from Canada came in as mixed alsike and white clover.

Red Clover.—A large amount is yearly harvested in Great Britain, and imports, inversely fluctuating with the home crop, ranged from 50 tons to 1500 tons per annum. The bulk came from France, mid-Europe, and Russia occasionally. Chile also supplied a considerable amount, U.S.A. and Scandinavia some, and New Zealand amounts ranging from 2 tons to 100 tons.

No account is taken of the considerable trade in *Agrostis* and Fescue seeds, as these were used almost exclusively for lawns and sports field work.

It will be seen how insecure is the seed supply position of Great Britain, with all Continental supplies cut off, and ever-increasing areas going down to leys of one kind or another. The ryegrass position is in normal harvest years fortunately well safeguarded, but alternative sources have had to be found for a large part of the supplies of other seed.

New Zealand's Chance

One of the most hopeful sources of supply for certain lines is New Zealand, which already has a fairly well-established, though small, market for some of her herbage seeds in this country. The following table of exports to Great Britain over the last five years gives an indication of this trade:—

New Zealand Exports of Herbage Seeds to Great Britain, 1935/36 to 1939/40.
(Figures from "New Zealand Annual Statistics.")

Species.	1935-36. Tons.	1936-37. Tons.	1937-38. Tons.	1938-39. Tons.	1939-40. Tons.
Ryegrass	1,649.8	261.85	345.2	60.8	18.85
Cocksfoot	35.85	68.2	11.2	33.85	53.9
Crested Dogstail	59.2	284.65	23.9	163.55	29.05
Red Clover and Cowgrass ..	—	109.9	30.15	2.2	74.85
White Clover	50.15	115.25	75.7	91.1	103.15

The general performance of New Zealand seed in Great Britain is fairly well known. New Zealand certified seeds are held in good repute, though uncertified lines are known to vary considerably and are sometimes unreliable. They are, for the most part, on a par with uncertified lines finding their way on to the English market from other sources, and their sale depends upon competitive prices.

In view of the knowledge of performance and the large amount of seed grown in New Zealand, this country is looked upon as a potential source of supply for the increasing quantities required in war time, and most likely for some time after the war, when large areas of ploughed-up land will undoubtedly be sown down to grass to regain fertility.

The species which chiefly concern New Zealand are:—

White Clover.—This seed presents the most difficult supply problem of all, as it is an essential plant of medium to long leys and the chief source of supplies was Europe. It is hardly likely that Britain can become wholly self-supporting as regards white clover seed, and New Zealand is the only alternative large supplier. New Zealand uncertified seed is suitable for temporary leys in some districts, while New Zealand certified white may be used for longer leys. The certified types are looked upon as being intermediate as regards persistency between uncertified types and the best wild white clovers in this country. They are not quite as persistent or dense as Kentish wild white, though more productive, being very similar to Aberystwyth S 100 white clover in this respect.

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Red Clovers.—The large pre-war imports of this seed from Europe are being replaced mainly by American and Canadian seed with small quantities from New Zealand. New Zealand certified Montgomery in particular performs well and is growing in popularity. The seed sample is excellent in appearance, reliable, and its use is likely to increase. In normal times the price of New Zealand Broad Red clovers is usually higher than that of English and Continental seed, so that the volume of sales largely depended on the European harvest.

Cocksfoot.—At one time a large export trade in cocksfoot seed was carried on with Great Britain, but with increasing supplies of the cheaper Danish cocksfoot, this had fallen off. With these Danish supplies now cut off, attention has once again been turned to New Zealand as a source of supply. Attempts have been made to obtain seed from other sources, e.g., Chilian seed (usually sent to the Argentine) has been imported in fair quantity in the last two years, and there has also been a slight increase in the production of cocksfoot seed at home.

New Zealand certified cocksfoot is more leafy and therefore considered to be superior to Danish, though the latter may have been appreciably improved in latter years. Aberystwyth strains are, on the other hand, superior to New Zealand certified seeds for certain uses, and seed production areas are being materially extended. If the price of New Zealand certified seed could be brought down somewhat and the purity increased, there is no doubt that the market would expand considerably, for it gives good performance in this country, and the seed is reliable.

Ryegrasses.—Though not so dependent on outside sources for these grasses, Great Britain is likely to require increasing quantities from New Zealand in the next few years. Neither New Zealand uncertified, Italian, or perennial ryegrasses find favour in this country, and in fact are condemned by most agricultural workers as giving variable and frequently unreliable performance. The certified strains of perennial ryegrasses commence spring growth rather later than Irish commercial, but are more productive and more persistent in nature. Amongst the more valuable economic ryegrasses the Aberystwyth strains and British indigenous such as Kentish are the main competitors. New Zealand certified strains start away earlier in the season, give greater production in the first seasons, but on moderate to poor land at least are not so persistent over a number of years. The price of New Zealand certified seed on the other hand is usually considerably lower than that of the bred strains. New Zealand certified Italian ryegrass which has recently come on to this market is showing promise and has performed well in recent trials throughout England.

This brief outline will give some idea of the calls that are likely to be

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made on New Zealand seed production. It should also give some indication of the potentialities of the British market. Before the war this market was highly competitive, for Britain drew upon seed the world over and the trade depended as much upon competitive prices as on real worth of seed. This position is changing gradually and amongst the better farmers the advisability of sowing good strains of seeds is more widely realised. While, therefore, the trade in uncertified New Zealand seeds still will depend on competitive world trade, there is a definite place for certified seeds.

Trial Plots

Although the high performance of New Zealand certified seeds is fully realised by farmers in the Dominion, there has been a tendency for those concerned with seed production for export to assume that the British market would automatically be convinced that they would perform as well under British conditions. In order, however, to show the value of New Zealand strains in Britain, it has appeared essential to institute a series of large-scale trial plots, distributed as widely as possible, to obtain reliable information on actual performance under practical conditions of farm management.

In conjunction with the Grassland Improvement Station, near Stratford-on-Avon, under Sir George Stapledon, with the co-operation of county agricultural authorities, thirty trial centres were laid down in the spring of 1941 in fourteen English counties. Each trial consists of five plots of an acre each sown with different mixtures. The first mixture is mainly Aberystwyth ryegrass and white clovers, the second, Aberystwyth ryegrasses and white clovers, with the addition of Aberystwyth strains of Timothy and Meadow fescue; the third, Aberystwyth ryegrasses, Timothies, cocksfoots, and white clover, as well as Kentish wild white clover; the fourth, commercial seeds of ryegrass, Timothy, cocksfoot, and white clover; and the fifth, New Zealand certified seeds of ryegrass, cocksfoot, and white clover. The exact details of the mixture of the New Zealand plot are as follows:—

	Lbs.
Certified Mother Italian Ryegrass ..	6
,, Perennial Ryegrass	16
,, Cocksfoot	8
,, N.Z. Mont. Red Clover ..	4
Commercial Timothy	4
,, Trefoil	½
,, Alsike	½
Total	40

The trials have been sown under widely-varying conditions. Some have been sown on exhausted arable land, and some on freshly-ploughed grassland. Soil conditions vary from sandy loams to heavy clays. Some have been sown down under cereal crops, but the majority have been sown without a cereal "nurse." The management of the ley is left largely to the farmer and his local technical adviser.

The mixtures are for long leys, so that it is too early yet to predict results, but it can be said that observations carried out during the first season have shown that the New Zealand plots compare favourably—in some cases more than favourably—with the other plots in establishment and swarding ability. During the coming season it is hoped to extend these trials by the laying down of a further forty. The seeds for these are being shipped from New Zealand and will have a known origin and history, so that results can be followed through with considerable accuracy.

Arrangements are also under way to have carried out a number of small plot trials of bred strains of herbage plants which are reaching the commercial production stage in New Zealand, and which may be of value in Great Britain.

It is only along such experimental lines and the continuous production of reliable seed that a sure foundation can be laid for a permanent seed trade.

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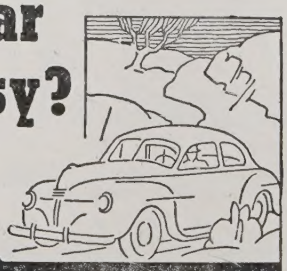

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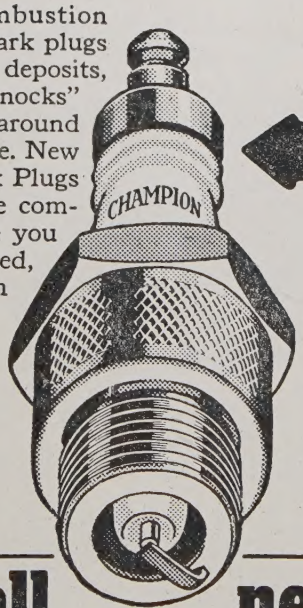

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Making of Charcoal

Fuel for Farm Gas Producers

By
J. H. SMITH, B.E., B.Sc.,
Forest Engineer,
N.Z. State Forest Service.

CHARCOAL is one of the most satisfactory fuels for use in gas producers and, while it is now being produced commercially in New Zealand on a limited scale, the steel kilns normally used are high in first cost and are economical only where a battery of say six or more is operated together. Many farmers, however, wishing to produce charcoal for their own use, will find that they have supplies of suitable timber on their properties or otherwise readily procurable, and the methods outlined below indicate alternative ways of making charcoal of a quality suitable for use in gas producers but without necessitating the purchase of expensive plant.

The best charcoal is obtained from the densest timbers, but many of the lighter timbers are also satisfactory, although the yield by weight per cord of wood will be less. The timber should be well seasoned, since the yield of charcoal from green cordwood is appreciably lower than that from dry wood as well as being more difficult to burn. To season timber as quickly as possible it should be cut into lengths not greater than 4ft. Large round timber should be split so that no piece is greater than approximately 4in. in any cross-sectional dimension. Small branch wood, or sizes commonly met with in manuka, need not be split. The cordwood should then be open-stacked, i.e., stacked in alternate layers at right angles to each other, allowing a reasonable space between pieces. The wood should be seasoned in an open site providing the maximum possible air circulation, and the stacks should be at least 3ft. apart.

Only sound wood and preferably free from bark should be used.

Successful charcoal burning depends largely on the judgment of the operator, but after a brief period of trial and error it should be possible for anyone to make good charcoal by one or other of the following methods:

*Drum Method**

The use of a drum such as a 40-gallon oil-drum (fig. 1) for burning charcoal is a method which can readily be improvised to produce quite a good quality of charcoal. Obviously a single drum produces only a limited quantity at each burn.

First, remove the bottom of the drum by cutting around the inside of the rim. Unscrew both plugs and make two more holes equidistant from the others (fig. 1A and B), (just a gash with a cold chisel 2 in. by 1½ in.).

The drum is now ready for burning. Place the drum, open end up, on two 1 in. pipes or similar objects and light a small fire inside it (fig. 1C). The pipes are to allow air to get to the fire. When the fire is burning

* From "Producer Gas Vehicles," Department of Defence, Melbourne.

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brightly, fill up the drum with wood, about 3 ft. long and 3 in. or 4in. thick (fig. 1D). It is essential that the wood should not be longer than the drum. When this is burning, the drum should be rocked and shaken vigorously about from time to time to make the charcoal fall to the bottom of the drum, and to keep the fire compact. It may be necessary to knock the charge down with a hammer if shaking does not bring about the desired result.

Slow Compact Fire

As the long vertical wood burns away it may be replaced by shorter wood of similar thickness. Care must be taken to keep the fire compact, and it must not burn too quickly. To regulate this, take one, or both, 1 in. pipes away from the bottom. More wood has to be added from time to time as the fire burns, and a watch should be kept for any white ash on the charcoal, as this means that it is burning and being wasted. Try to get a slow compact fire with the flames just licking around the wood.

Much attention is required during the first two hours of burning, and during this period it is not advisable for one man to operate more than two drums.

When the drum is full of charcoal, and no more wood can be added, replace the cut-out bottom (fig. 1E). This should jam tightly, but if it does not, make two holes and put across a wire skewer. With the bottom in place turn the drum upside down on a bag, with the aid of a shovel, and allow it to stand until smoke has stopped coming off, then place a piece of tin over each hole and cover with sand or loam (fig. 1F). Also bank up around the bottom to exclude air.

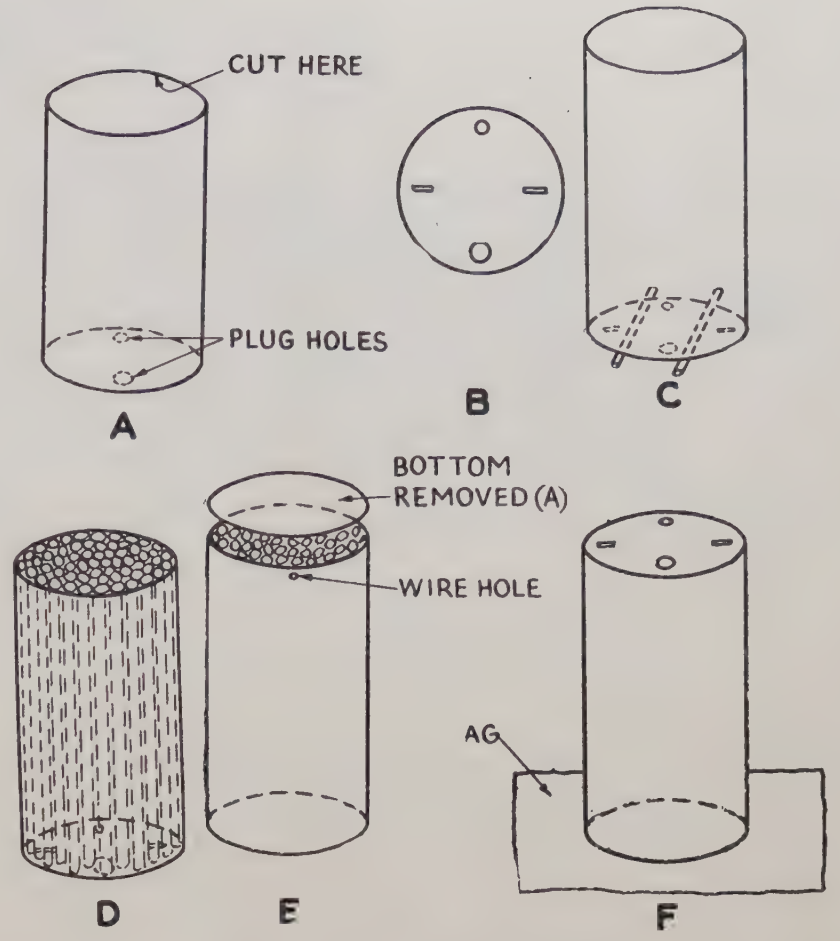

Fig. 1.—"Drum" method of burning.

The drum, if properly sealed, goes out over night, and may be emptied next morning. Each drum should yield approximately two bags of charcoal. The average time of burning is five to six hours, and for cooling about eighteen hours. Any partially burnt wood should be put on one side and burnt again.

Pit Method

Difficulties in obtaining metal with which to construct kilns has led to much experimental work on improved types of pits. The Queensland Forest Service vented pit is typical of recent developments. This pit is 6ft. 6in.

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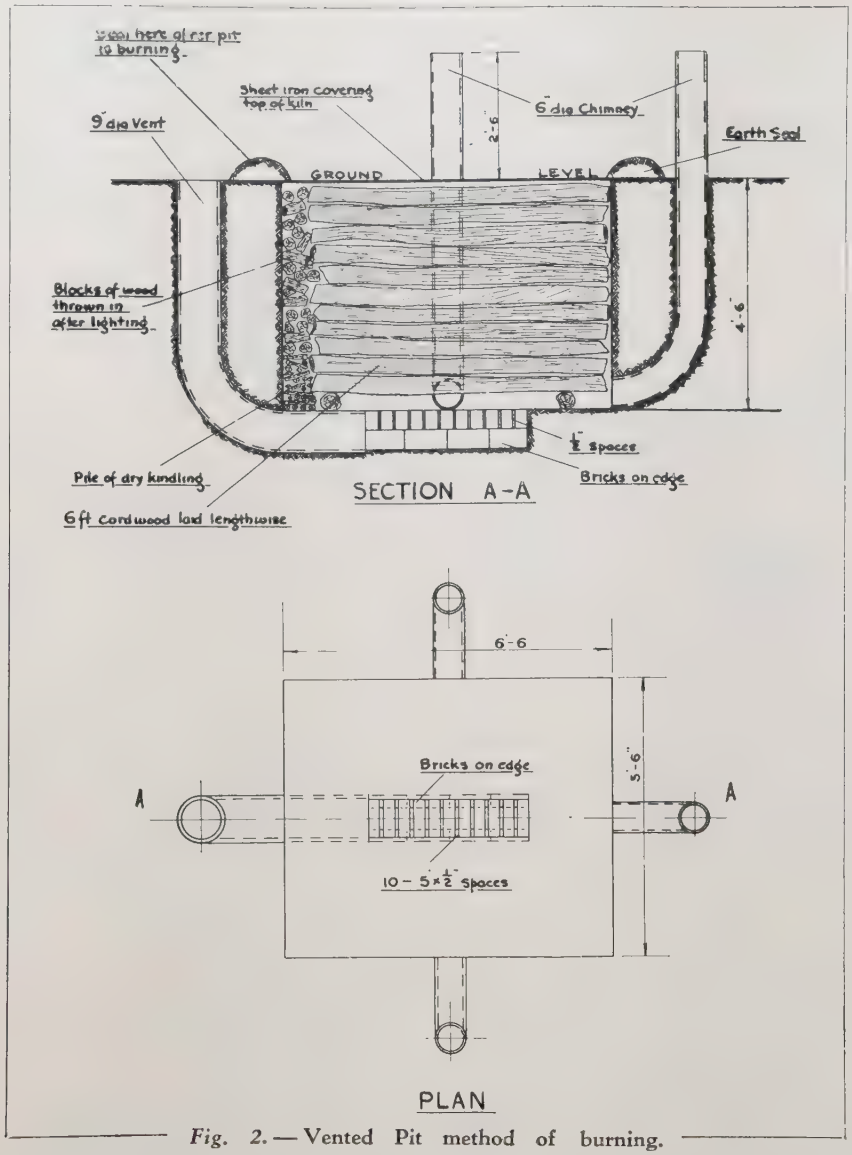


Fig. 2. — Vented Pit method of burning.

long, 5ft. 6in. wide, and 4ft. 6in. deep. There is one inlet and three outlets, as shown in Fig. 2. All the pipes are earthenware drainpipes, 6 in. diameter for the outlets and 9 in. diameter for the inlets. The pit is lined with bricks or sheets of old iron held in place by iron pipes or bars driven into the floor of the pit. When charged, the pit is covered with sheets of iron which are supported by rails and sealed with earth.

Loading.—Two pieces of cordwood 3 in. to 6 in. in diameter are laid crosswise on the floor of the pit near the ends. On this foundation 6 ft. cordwood is laid lengthwise to fill the pit except that, at the inlet end, space is left for a pile of dry timber. The chimneys are fitted in place and the top is partially covered and sealed, leaving a space about 1 ft. wide at the inlet end.

Igniting.—The timber is lit from the top and the fire allowed to burn for ten to thirty minutes, depending on the facility with which the charge ignites, but usually about fifteen minutes. During this time blocks and scraps of wood are thrown in to pack the space left at the inlet end when stacking. When the fire has a good hold at the end the top is closed and sealed. At the same time the edge of the sheet at the far end is lifted 3 in. to 4 in. to draw the fire along the pit for about fifteen minutes. At the end of this period the pit-cover is sealed and the vents should soon commence to smoke freely. The emission of smoke may be slow for the first few hours, but, if the rate of smoking appears to be decreasing, the outlet end of the cover is lifted slightly for an extra boost.

Usually the pit is well alight and smoking freely after one hour to two hours and the vents can be closed to 3 in. diameter openings and gradually reduced to 2 in. or even 1 in. At the same time the inlet opening is reduced to half. It has been found that during the burn with all outlet vents fully opened, one or other of them acts as an inlet, but by gradually reducing the size of all of them they can be made to smoke evenly.

Carbonising.—The pit is allowed to burn until the dense white smoke turns to a light blue and very hot smoke. As vents "burn out" they should be sealed, and finally all vents and inlets are closed and sealed. The burn should occupy twenty-four to forty-eight hours, the average time being thirty-six hours.

Cooling.—Vents and inlets are closed and sealed with earth and the kiln left to cool. If large sheets of iron are used for covering, large areas of metal can be left bare without impairing the seal, and thus hasten the cooling, which should not take more than three days and may occupy only one day.

In this and all methods of pit burning, particular care must be taken to ensure airtight sealing during the cooling period, or charcoal will be wasted. This is only possible with non-porous soils, a limitation which must be considered in selecting the pit-site. The complete lining of the pit-walls, whether with corrugated iron, old metal sheets, or bricks, is also of great importance since earth must be prevented from mixing with charcoal.

It should be noted that the manufacture of charcoal for sale must not be undertaken except pursuant to a licence issued by the Timber Controller. No fee is payable for this licence and anyone contemplating making charcoal for sale and desiring further information should apply to the nearest office of the State Forest Service or communicate direct with the Director of Forestry, Wellington. A publication entitled "Charcoal Manufacture for Producer Gas" by T. T. C. Birch is available for general distribution. Conservators of Forests are stationed at Auckland, Rotorua, Palmerston North, Nelson, Hokitika, Christchurch, and Invercargill.

PASTURE TOPDRESSING

Results From Heskett Slag Trials

By
A. G. ELLIOTT,
Crop Experimentalist,
Fields Division, Wellington.

The investigation described in this article details results secured from applications of Heskett Slag on a wide range of pasture types under varying soil and climatic conditions throughout the Dominion. The work is one of the routine duties carried out by officers of the Fields Division, and all new fertilisers on sale to farmers are investigated in the same manner under the "response survey" method. In the September, 1941, issue of this Journal, results from serpentine superphosphate trials were published, and information in regard to other fertilisers now under investigation will be presented as the data becomes available. The present article describes results from 130 trials in which Heskett Slag is compared with imported basic slag and superphosphate, covering the period 1938 to 1942.

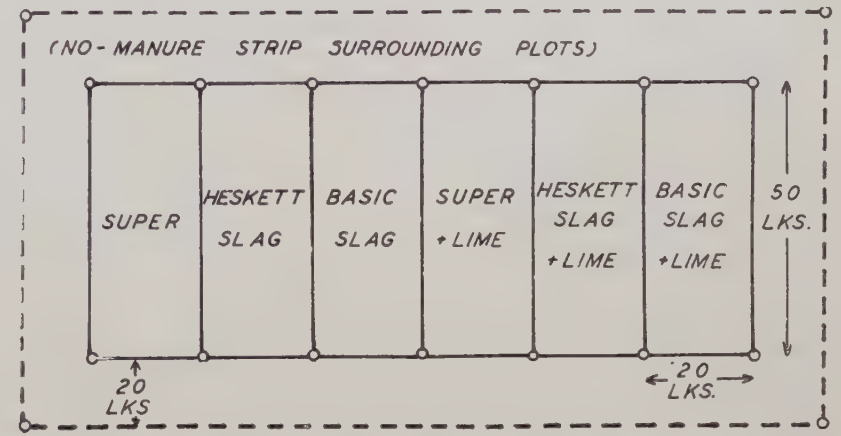
FOR investigations of this nature the "response survey" method described in the April issue of this Journal has proved successful in providing valuable data secured from regular observations on a number of small trials each laid down in duplicate, on a typical well-managed pasture in as many districts as possible. All fertilisers now used in farm practice are under investigation and the project here described is of particular interest since comparisons are made between a locally-produced slag, imported basic slag, and superphosphate.

Fertilisers Used

The following is an analysis of the three fertilisers used in this investigation:—

	Total phosphate (P_2O_5) Per cent.	Form of Solubility.
Heskett Slag ..	15.0	citric soluble
Imported Basic Slag	15.0	citric soluble
Superphosphate ..	22.0	water soluble

The use of a 15 per cent. grade basic slag was based on approximately equal phosphate content with that of the Heskett product and these two fertilisers are comparable in general plant food value as shown by analysis. Both are citric soluble and contain proportions of "minor elements," the place of which in plant nutrition is still under investigation. Neither of these citric soluble, and consequently more slowly-acting phosphates, can be strictly compared with water soluble superphosphate except on a basis of purchase price per unit.



Plan of manurial trials described in this article.

The scope of the investigation, however, was confined entirely to the responses seen on typical pastures topdressed with the three fertilisers, applied at the same rate per acre, irrespective of phosphate content, on limed and unlimed plots. The results presented are indicative of those secured by farmers under the conditions obtaining in the districts in which trials were placed. All fertilisers were

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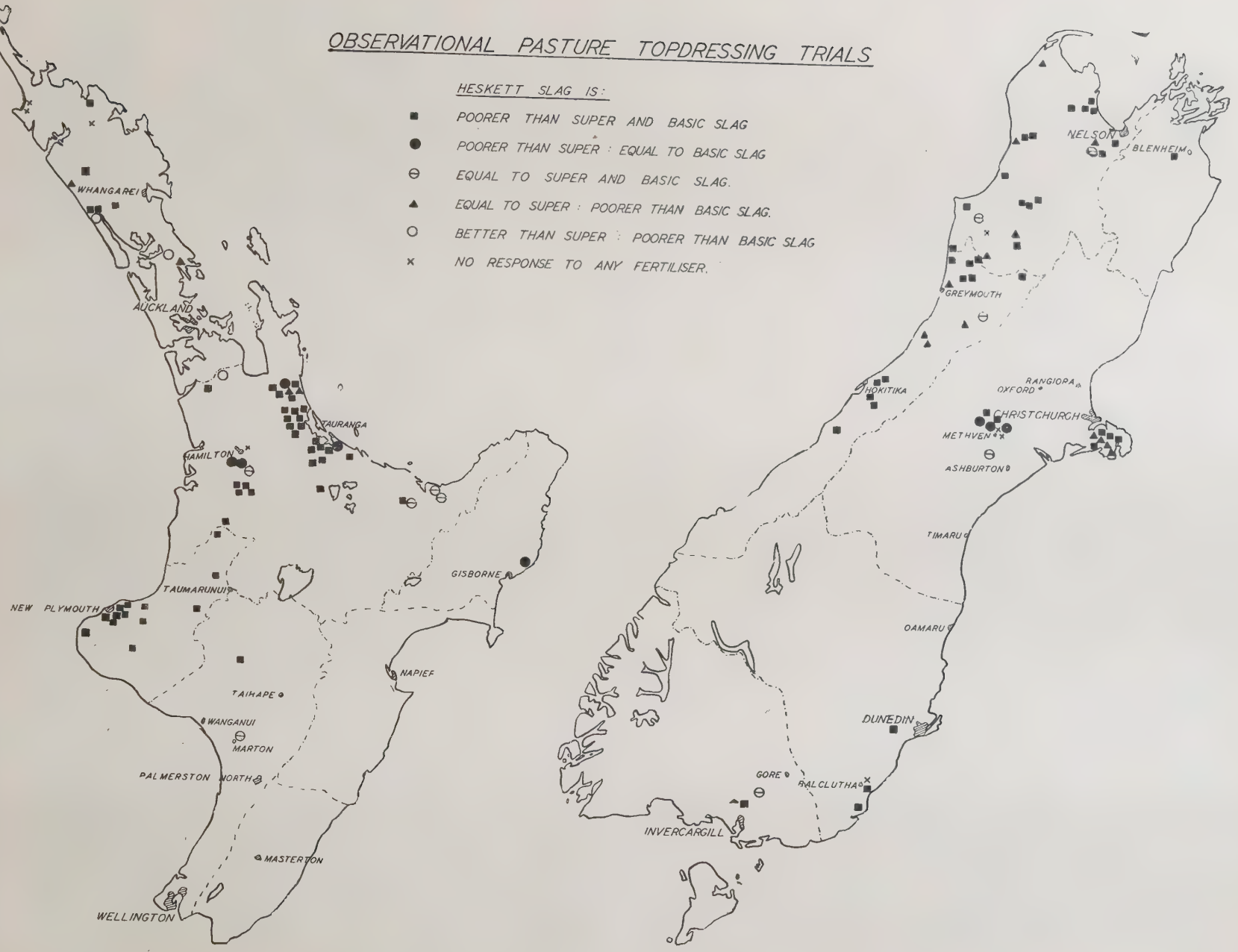

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applied annually at the rate of 3cwt. per acre and on the limed plots 1 ton per acre of carbonate of lime was topdressed in the first year only.

The fact that the analysis shown in the latest registration of Heskett slag indicates that the fertiliser has been reduced from 15 per cent. to 10 per cent. total phosphate suggests that a change either in the formula or in the method of processing has been made since this investigation was commenced.

The accompanying sketch plan shows the layout employed in the 130 trials laid down, and comparisons involving critical observations in regard to vigour, density, and general production of swards in each topdressed plot, with and without lime, and also on the untreated area surrounding each series, are made at regular intervals. A pointing system to indicate degree of response to treatment is employed and the opinions of the co-operating farmer are secured wherever possible.

Location and Responses From Trials

These are shown in the maps accompanying this article, and it will be seen that trials were laid down in the principal pasture production districts and on the main soil types in the Dominion. Typical farms under management common to the territory were selected, and consequently the results secured can be taken as indicating the relative value of the fertilisers applied over a wide range of conditions, and under varying seasonal influences.

Where no responses are shown this is due to two comomn causes, either where plots are laid down on heavily topdressed, intensively stocked areas as in the Waikato, or else where a particularly poor soil type is encountered as in three of the North Auckland trials.

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Summary

Results from the trials described are summarised in the following table, in which the response from Heskett slag is compared with that from the two fertilisers named:—

NUMBER OF TRIALS.

District.	Poorer than Super and Slag.	Poorer than Super, equal with Slag.	Equal with Super and Slag.	Equal with Super, poorer than Slag.	Better than Super, poorer than Slag.	No responses.	Total trials.
N. Auckland ..	5	0	0	2	2	3	12
Waikato-King Country ..	9	2	1	0	1	1	14
Waihi-Bay of Plenty ..	21	2	3	2	0	0	28
Taranaki ..	10	0	0	0	0	0	10
Ohakune-Marton	1	0	1	0	0	0	2
Gisborne ..	0	1	0	0	0	0	1
Nelson ..	6	0	1	2	0	0	9
West Coast ..	20	0	2	7	0	1	30
Marlborough ..	1	0	0	0	0	0	1
Akaroa ..	4	0	0	4	0	0	8
Ashburton ..	2	3	1	0	0	2	8
Dunedin ..	1	0	0	0	0	0	1
Balclutha ..	2	0	0	0	0	1	3
Invercargill ..	1	0	1	1	0	0	3
Total for Dominion	83	8	10	18	3	8	130

Acknowledgments

The work of officers of the Fields Division and the practical assistance of farmers on whose holdings the trials were situated are gratefully acknowledged. Without the co-operation of members of the farming community, the essential coverage secured by laying down a number of plots on a wide range of soil types under various climatic and farming conditions would be impossible. The work of trained observers, who supply the detailed reports, provides the fundamental information on which results from the investigation as a whole are based. Consequently the success of the "response survey" method is in large measure due to the close co-operation between farmers and instructors, and the results secured are for use principally by those who assist in the project.

The adoption into farm practice of results from investigational work is the reward of all who help in projects of this nature, and while the present happy relations are maintained, members of the farming community can be assured that problems and questions relating to fertilisers will be fully investigated.

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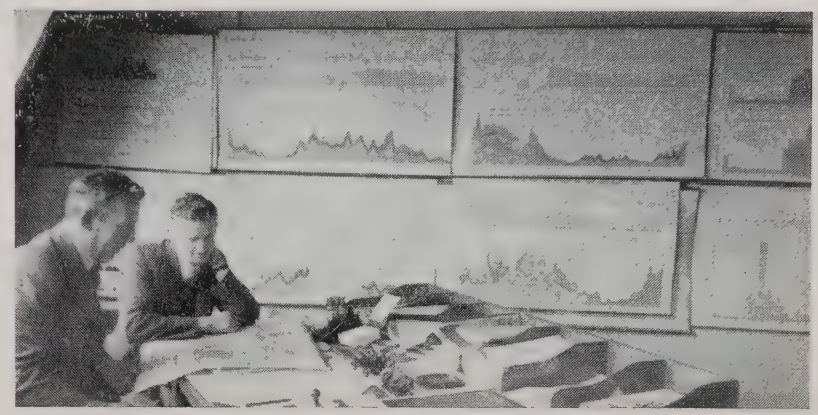
The investigational work carried out by officers of the Fields Division is recognised as an important activity, wide in its scope and modern in its methods and technique. In the description of the development which follows, the value of this work to departmental officers and farmers generally will be recognised by all interested in agriculture in New Zealand.

Field Investigational Work

By R. B. TENNENT,
Director of the Fields Division, Wellington.

THE first field experiments conducted by the Department were carried out in the South Island in 1899, and this work has become an increasingly important part of the duties of officers of the Fields Division. The development to the present time, when approximately 1000 trials are in progress each year, covering every instructorate in the Dominion, has been a striking tribute not only to the early workers, but also to their successors in office. Before the appointment of Mr. A. W. Hudson in 1927 as the first Field Crop Experimentalist, the work was carried out on a local basis, and was concerned principally with annual crops. Trials were placed on the Experimental and Demonstration Farms and on private holdings, and results obtained were not always applicable outside the area concerned.



The crop experimentalist and his assistant discuss a graphical method of presenting results from trials. Note the graphs of other trials displayed in the background.

The appointment of a specialist officer enabled work to be organised on modern lines, enabling accurate data to be secured from carefully-planned lay-out of plots, the results from which could be examined statistically. Only trials requiring detailed work, which could not be carried out on privately-owned holdings, were established on farms under Departmental control, and the number of co-operative field experiments on areas under reasonably good management was greatly increased. In this way it was possible to lay down trials on areas covering a wide range of climatic conditions and soil types. The present article will describe the development of investigational work covering the period from 1927 to 1941.

General Outline Of Activities

Before 1927 field trials were chiefly concerned with such annual crops as wheat, turnips, swedes, mangolds, potatoes, and green fodder crops, the obvious difficulties in field technique retarding the development of pasture investigations. Certain valuable information in regard to varieties and manurial treatment of crops was secured, and the early work also assisted grassland farmers interested in topdressing at that time. During his term of office Mr. Hudson laid the foundations of the present system of standardised lay-out of trials, based on original and overseas ideas embodying the minimum of field work to produce results capable of statistical examination. The present system of recording was also introduced at that time. As the demand for information grew, the scope of the work increased, and the activities at present under way

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can be described most satisfactorily under the headings which follow.

With the formation of the special Divisions of the Department of Scientific and Industrial Research, and also with the development of the Wheat Research Institute, followed later by the creation of the Animal Research Division of the Department of Agriculture, valuable work of a collaborative nature with these organisations has become a feature of the duties of the Field Crop Experimentalist in association with officers of the Fields Division.

The projects at present under way can be grouped conveniently under the following headings:—

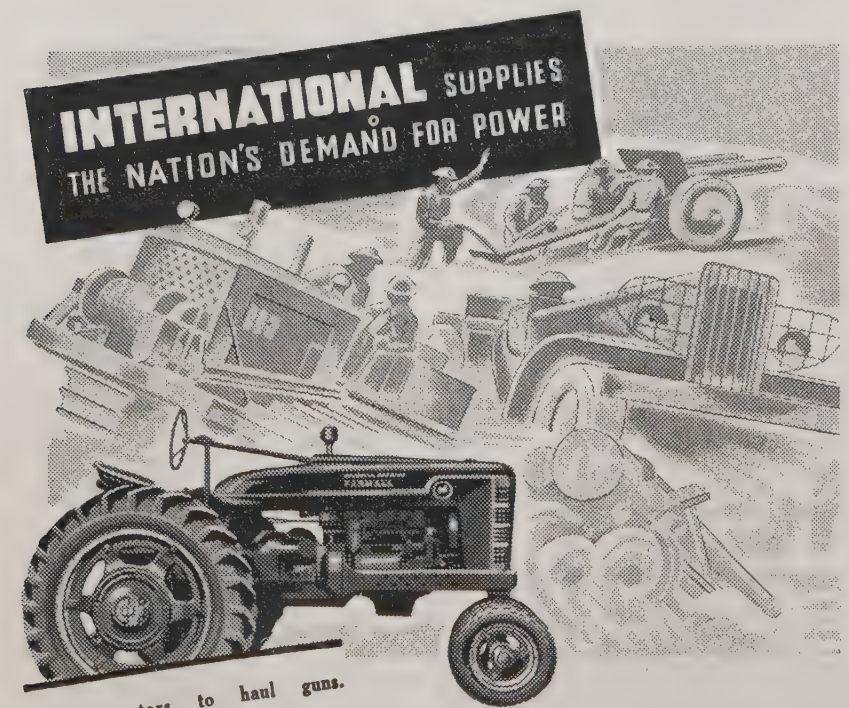
(1) Long-term pasture investigations.
(2) Special pasture manurial trials.
(3) Pasture species trials.
(4) Field crop investigations.
(5) Young Farmers' Clubs trials.
(6) Crop and pasture surveys.
(7) General projects.

The lay-out of a pasture mowing and grazing trial (Hudson).

(1) Long-term Pasture Investigations

As special technique is involved in these detailed trials in which the production from a number of replicated plots under various treatments is measured, they are carried out on areas under official control on the Marton Experimental Area, the Ruakura Animal Research Station, and the outlying area at Karamu, as well as on the Demonstration Farms at Stratford and Winton. The 15 trials in this group can be described as:—

(a) Trials under the "mowing and grazing" technique, evolved by Hudson, in which the relative production from replicated plots, topdressed with various phosphatic fertilisers and lime, is being measured. Of the number of these laid down eight years ago at Marton, and later at Ruakura, several have been finalised and the results published. At present, only one trial at Marton, which will be described later, is being continued under the original technique, the others having been modified to eliminate grazing and possible transference of fertility. Under the present technique, the material cut and weighed from each



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plot is returned to the area from which it was obtained.

(b) "Rate of growth" trials, in which production is measured by cutting and weighing material enclosed in movable frames, either 11 feet by 11 feet, or 11 feet by 5 feet 6 inches in area. These are moved from place to place within the treated plots, and the method, which involves cutting at regular intervals, following a trimming with the mower to provide a common basis for growth measurement, is giving useful information under practical farm conditions. Trials under this technique are being carried out at Karamu, Ruakura, on the Demonstration Areas at Stratford, Marton, and Winton, and on irrigated areas at Winchmore and Levels.

(c) Investigations into field technique made necessary by local experience and to include overseas methods, are being carried out on two trials at Marton and one at Ruakura. At Marton, the original "mowing and grazing" technique is being continued on one trial, which is aimed at measuring the residual effect of fertilisers and lime applied during the previous eight-year period of the topdressing experiment. In the other trial on this area various fields sown in selected species are under such grazing management that dominance of the sown species is maintained. Production is measured by a modification of the "rate of growth" technique, in which the material actually consumed by the grazing sheep is weighed. From data already secured, it is obvious that valuable information in reference to the maintenance of species, and the contribution of ryegrass, cocksfoot, red, white, and subterranean clover to total production will be obtained from this investigation. At Ruakura, a comprehensive trial investigating the effect of possible transference of fertility under the "mowing and grazing" technique is established. In this trial, production is measured from one section by the usual method where sheep graze over all plots. Measurements are also taken from a series of plots in fenced areas, and so grazed that stock cannot transfer fertility from one treatment to another.

(d) Pasture irrigation trials begun in 1939 are laid down at Winchmore and Levels, where production is measured under the "rate of growth" technique from both irrigated and non-irrigated areas. Useful information regarding total and seasonal production and the increase resulting from irrigation is being secured.

(e) Grazing trials in which the one at Marton, planned to secure comparisons in grazing days per acre between

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the three systems, loose, set stocking and rotational, has provided very useful and practical information, in which the value of the rotational system has been amply demonstrated. At Winton, the four trials in operation are supplying grazing figures from fields sown in Hawke's Bay versus Southland ryegrass, simple pasture mixtures versus complex mixtures, British Indigenous versus Selected ryegrass, and the recently produced Short Rotation versus Pedigree ryegrass.

In all mowing trials (a) to (d) above the work is carried out in close co-operation with chemists, either of this Department, or those in the Chemistry Section of the Plant Research Bureau, Department of Scientific and Industrial Research. These officers supply dry matter figures from samples of mown herbage on which yields are calculated, and also carry out analyses of dried material for fertiliser uptake. Soil samples from all plots taken each year are also analysed to supply data in reference to the effect of fertilisers applied. Officers of the Grasslands Division, Department of Scientific and Industrial Research, examine herbage samples from each cut, and supply the percentage by weight of the species in the sward under treatment. Meteorological data covering rainfall and soil temperature and evaporation in the two irrigation trials is accurately recorded for each experiment. With the assistance of various officers of other Departments, it has been possible to present valuable and comprehensive data in all trials finalised and written up for publication.

(2) Special Pasture Manurial Trials

The system inaugurated by the first Field Crop Experimentalist has been followed, with minor modifications, in all investigations of this type, in which the aim has been to lay down a number of small observational trials on farms under reasonably good management, and covering a wide range of soil types and climatic conditions throughout the Dominion. The group known as the "L.P.K." series was one of the first planned on this basis, and was aimed to investigate the value of lime, phosphate, and potash. Under this method, each trial is laid down in duplicate, and is reported on at regular intervals for a minimum of three years. Instructors prepare reports covering the laying down, progress, and final summary on each trial. The survey location of each experiment is given, and this enables the Field Crop Experimentalist to place it with fair accuracy on a large scale map, and finally on a map of the North or South Island.

Very valuable information has been secured from the "L.P.K." series, and it has been possible to define broadly the areas on which the lime and fertilisers applied can be relied upon to give satisfactory results. In a method of presentation introduced last year for all observational trials, each is shown

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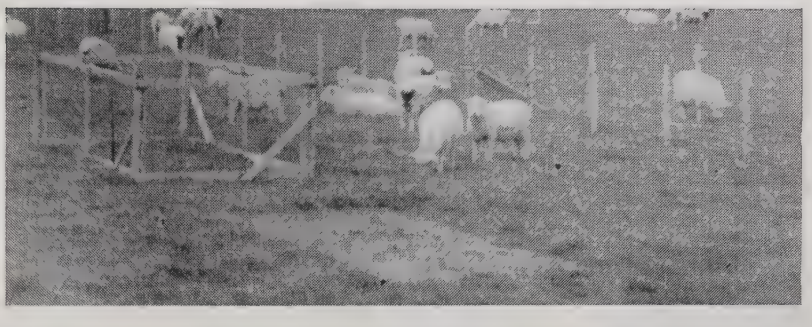
on a map by a coloured indicator, which clearly shows the degree of response to the fertiliser under investigation. The indicator colours are changed in accordance with the latest data available. Officers of the Soil Survey Division, Department of Scientific and Industrial Research, assist in this type of investigation by defining the soil types in the districts surveyed to date.

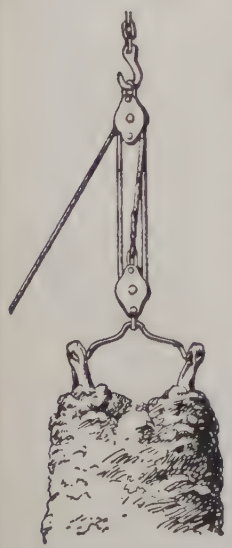
In the second series of trials of this nature, different phosphates, including Heskett Slag, K-phos, Kotkur, and the various Pacific Island and North African ones, were compared with superphosphate, superphosphate plus lime, and basic slag. Mowing trials under the "mowing and grazing" technique, later modified to exclude grazing, were laid down at Marton and Ruakura to provide comparative data in reference to production from many of the fertilisers mentioned above in the observational topdressing series.

During the last two years the introduction of serpentine superphosphate made necessary an immediate large scale investigation in which new features were the defining of soil types by the Soil Survey Division, analysis of soil samples before the application of lime and fertilisers, and the measurement of uptake by analysis of mown herbage samples from individual plots cut at regular intervals.



The technique used in enclosure method, showing the frame which encloses the area to be mown. The area mown on the previous week is in the foreground.

Related to the serpentine superphosphate investigation was the question of magnesium deficiency in soils, and on areas defined by the Soil Survey Division, a number of trials, including plots topdressed with magnesium sulphate, were established. Mowing trials to measure production from plots topdressed with serpentine superphosphate, superphosphate



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plus magnesium sulphate, superphosphate and superphosphate plus lime were laid down at Marton and Ruakura to supply additional information to that secured from the observational series.

The shortage of potash led to investigation into the possibilities of securing this fertiliser from the seaweed *Macrocytis* or from glauconite, and trials to compare these materials with 30 per cent. potash salts were laid down in the Waihi, North Taranaki, and Southland districts.

(3) Pasture Species Investigation

Pasture species investigations are planned and conducted in co-operation with the Grasslands Division, and the trials contain newly selected or introduced species of various pasture plants, which are compared by observation with an accepted standard for each species. In this series of trials the value of various strains of ryegrass, cocksfoot, white, red, and subterranean clover has been investigated on farms throughout the Dominion, and as each is continued for a minimum period of three years, very useful information has been secured. Recent trials in this group include introduced strains of timothy, *poa pratensis*, and crested dogstail as well as the lately developed short rotation ryegrass.

The early work of the late Dr. L. Cockayne in connection with pasture regeneration in the montane tussock country of the South Island supplied information of fundamental value. Details of results from field trials carried out on the Northburn Station have been published, and this type of investigation is being continued on the Pisa Flat Experimental Area, where a wide range of pasture plants is under observation under typical Central Otago conditions. Other trials of a more specific nature are aimed at investigating methods of reducing losses in germination of ryegrass seed due to "blind seed" disease. and these are located at Marton and Winton.

The results following the introduction of earthworm colonies into pastures are being studied over a range of soil types and climatic conditions. Field experiments of a local character are those in connection with weed and erosion control, hill country pasture mixtures, pasture establishment methods, rates of seeding, clover inoculation, and methods of coping with damage to pastures caused by insect pests such as Porina and Odontria.

(To be continued.)

New Zealand must now be self-supporting in mangel seed, and steps have been taken to ensure that adequate supplies are available. This article

By
A. GRANT,
Fields Instructor, Timaru.

THE PRODUCTION of MANGEL SEED

outlines the methods which must be adopted if a successful seed harvest is to be obtained.

IN the Journal of Agriculture for July, 1941, reference was made to the necessity for the production within this country of supplies of mangel seed for local use, and the steps which had been taken to meet that need. This action resulted in the production of approximately 30,000lb of seed which, together with the carry-over existing from the previous season's sowing, provided ample seed to meet the 1941 demand.

The seed was produced in two districts, South Canterbury and Hawke's Bay. Rather different methods were employed in each district. The limited time available in which to get production under way made it essential to obtain roots from crops grown for fodder and to transplant them during the winter for seed production.

In Hawke's Bay the areas generally were hand-cultivated, both before and after planting, whereas in South Canterbury, where the larger acreage was grown, the cultivation was carried out with farm implements. As the latter methods more nearly approximated those likely to be used in the future, the experience gained in the South Canterbury district forms the basis of the recommendations contained in this article.

As supplies of mangel seed from overseas were not available, the area harvested for seed in the 1940-41 season was greatly increased, and the varieties grown were reduced to three, namely, Yellow Globe, Orange Globe, and Long Red. While it has been shown by the results to date that mangel seed can be produced locally on a commercial basis, it is considered that a warning against the uncontrolled production of this seed should be given.

Fig. 1.—A general view of a mangel crop coming away for seed.

Isolation Necessary

Firstly, it should be remembered that the total acreage necessary to be set aside each year for seed production does not exceed 100 acres in all, so that the risk of over-production should seed growing become general is great. Further, there is a definite necessity for isolation of the various varieties when seeding, both from one another and from other seed crops of the beet family. The pollen of this family is wind-borne and can be transmitted long distances to pollinate other crops with consequent deterioration of quality.

Lastly, while no insurmountable problems exist in the maintenance of type and quality in mangel seed, this aspect of seed production requires careful attention necessitating regular selection and control of the stock seed being used for commercial seed production. Growers are urged, therefore, to consider these points fully before they decide to produce seed.

While in 1940 bulbs were taken from commercial crops, this practice is not recommended, mainly because of the cost of purchase, transport, and setting out of the bulbs. The method now being adopted as far as possible is to sow seed in nursery beds early in the New Year in flat drills 14in apart. The seed is sown thickly and the seedlings are left in the ground over winter. The stecklings, as they are then called, are lifted in the early spring and transplanted immediately into their flowering quarters in the field.

Cultivation and Manuring

After transplanting there is no re-establishment of the tap-root, but the bulb throws out numerous root branches. The more friable the soil, the better will these root-branches perform their function. The best means

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of obtaining the required friability is by ploughing to a good depth in the autumn or early winter and allowing the frosts to do more of the subsequent cultivation.

If ploughing has been carried out early and the winter weather has been favourable, one or two grubbings and harrowing should bring about the required tilth. This should be done just before planting. The crop does well following cereals, potatoes, or roots, provided the latter are lifted or eaten off in time for early ploughing. Owing to the difficulty of breaking them down, old grass leys are not recommended.

The belief is widely held that the second year's growth of leaf and flowering stem procures all its nutriment from the bulb. This is entirely erroneous. No doubt some of the nutriment stored in the bulb passes to the stem but the bulk of the nutriment is obtained by the normal functioning of the leaves and roots. In normal seasons analysis of the bulbs before and after flowering shows little variation. The mangel is a heavy consumer of nitrogen and manure containing nitrogen and phosphate should be applied, if available, approximately at the same rate as for fodder mangels.

Fig. 2.—Mangel plant lifted out of the ground to show development of roots following transplanting.

Transplanting

Although there are several methods of planting, the quickest and the cheapest is that of ploughing the bulbs or stecklings in, laying them against the face of the turned furrow so that only the crowns will show above ground when they are covered by the next round of the plough. The angle at which the plants are set will not be any drawback in seed production.

The distance between the rows is governed chiefly by the minimum width at which the horse-hoe can be worked efficiently without damaging the plants. A distance between 28 and 36 inches is generally accepted and this range can be obtained by using the three-furrow plough. For small bulbs and stecklings planted out on clean ground where one or at the most two hand hoeings would suffice, a distance of 21 to 24 inches between rows would be ideal.

The distance between plants in the row is, of course, governed by the size of the bulb; for bulbs up to 3 and 4lb., 15 to 18 inches is the rule, for stecklings up to 1lb., 12 inches. The chief source of danger at this stage lies in working the soil when it is too wet. **To this, more than to any one other factor, can be attributed low yields;** the plants will not re-establish themselves and thrive properly in hard and

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"rubbly" conditions. A nice "mealiness" is essential to satisfactory yields. When planting, the plough should be driven at a good speed in order to throw the soil well up to the plants.

Fig. 3.—First seed stalk shooting away.

Harvesting

Where the crop is being grown under the supervision of the Department of Agriculture it will be kept under close observation by Departmental officers. A few days on one side or the other of the correct time for harvesting can result in enormous differences both to the quality of the seed and to the yield. Further, while those seed balls on the lower branches are quite ripe, those on the top branches are still immature. This accounts for the variation in colour of individual seed balls

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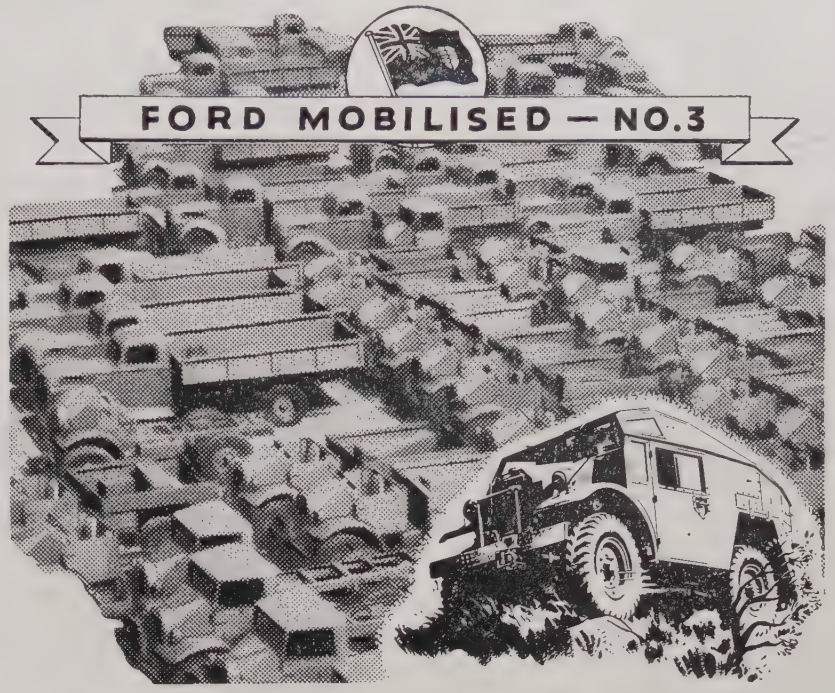

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in a sample, and the comparatively low germination of mangel seed generally. It follows, then, that the crop must be harvested while some of the seeds are still quite green.

When looked at as a whole, there comes a time when the crop changes from a bright to a dull bottle green. If, at this period, seed balls from the middle branches are cut open, definite starch formation can be observed and although still pulpy it is solid enough to be cut through with a sharp knife and will show up white. At this stage the stem, branches, and seed balls are still quite succulent and contain a green sap which can be freely expressed by pinching between the finger and thumb. Despite these signs of obvious unripeness, the crop should now be cut. If, however, any doubt exists the local Instructor in Agriculture should be consulted.

Except in cases of extreme thickness of stem, cutting is done with the binder. If the crop is exceptionally heavy and tangled, feering fingers should be fitted and only one row cut at a time. In every case a bag sheet should be slung under the binder to catch shed seed. The sheaves should be stooked immediately after cutting. If they are left lying on the ground seed will be lost. In muggy weather it is possible that the inside of the stooks may show signs of going mouldy. If this is so they should be turned.

Threshing

In a normal season the crop should be threshed in from 4 to 6 days after cutting, and here again, as at cutting time the question of "fitness" arises. The seed should be allowed to condition as much as possible, but if the stems and branches are allowed to become brittle they will be broken up by the drum and many of the seed balls will have a piece of stem adhering to them. These will not pass through the feed of a drill or ridger, and have to be dressed out, resulting in increased expense and further loss of seed.

It will be realised that the harvesting and threshing of the crop in a successful state gives rise to the possibility of the seed heating in the sack. Steps should be taken to minimise this possibility. The seed should be stored in a place and manner which will permit the free passage of air between the sacks and these should not be stacked more than one tier high.

Arrangements are now in train for the production of a further acreage of mangel seed under official supervision in the 1942-43 season so that farmers can be assured that seed supplies of this very important fodder crop will be available to meet their requirements.

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Slaughterings of Stock

THE following returns of slaughterings of stock at meat-export slaughterhouses and abattoirs for the eleven months, May, 1941, to March, 1942, have been compiled by the Livestock Division:—

District	Cattle	Calves	Sheep	Of which Ewes were	Lambs	Swine
North Island						
Meat-export Slaughterhouses—						
Auckland	156,666	579,425	326,636	176,733	1,393,079	374,955
Poverty Bay-Hawke's Bay	51,164	53,499	659,802	351,515	1,691,581	28,627
Taranaki-Manawatu ..	70,746	217,339	443,600	281,936	1,143,383	161,001
Wairarapa-Wellington ..	38,552	26,040	419,200	259,351	1,093,469	34,504
Totals	317,128	876,303	1,849,238	1,069,535	5,321,512	599,087
Abattoirs	108,469	44,964	448,866	228,560	91,004	120,472
North Island Totals ..	425,597	921,267	2,298,104	1,298,095	5,412,516	719,559
South Island						
Meat-export Slaughterhouses—						
Nelson-Marlborough ..	756	11,095	35,439	14,021	226,616	11,834
Canterbury	10,121	40,100	522,243	431,311	2,083,253	35,595
Otago-Southland	5,111	42,124	470,303	434,545	2,232,002	6,838
Totals	15,988	93,319	1,027,985	889,877	4,541,871	54,267
Abattoirs	50,234	12,244	250,789	134,432	49,956	40,651
South Island Totals ..	66,222	105,563	1,278,774	1,014,309	4,591,827	94,918
Dominion						
Meat-expt. Slaughterhouses	333,116	979,622	2,877,223	1,949,412	9,863,383	653,354
Abattoirs	158,703	47,208	699,655	362,992	140,960	161,113
Grand Totals	491,819	1,026,830	3,576,878	2,312,404	10,004,343	814,467
Same Period, 1940-41— Meat Export Slaughterhouses and Abattoirs ..	554,765	1,048,274	3,406,606	2,300,711	10,217,291	974,984
Same Period, 1939-40— Meat Export Slaughterhouses and Abattoirs ..	465,672	1,039,764	3,239,398	1,811,345	9,028,900	635,593

Slaughterings of Pigs

The 133,189 pigs slaughtered in meat export slaughterhouses and abattoirs during the month of March, 1942, were distributed in weight ranges approximately as follows:—

Up to 60 lb.	2,000
61-110 lb.	59,600
111-120 lb.	17,220
121-160 lb.	42,644
161-180 lb.	5,473
Over 180 lb.	2,837
Sundries	3,415

The grading of porkers is 91% of 1st quality and 9% of second quality, and that of baconers is 80% of prime 1's, 16% of prime 2's and 4% of second quality.

In the different weight ranges of baconers the grading is as follows:—

111-120 lb.	89%, 8%, 3% of P1, P2 and 2nds.
121-160 lb.	78%, 18%, 4% of P1, P2 and 2nds.
161-180 lb.	70%, 24%, 6% of P1, P2 and 2nds.

WIREWORMS

— By J. MUGGERIDGE, —
Government Entomologist, Department of Scientific and Industrial Research, Cawthron Institute, Nelson.

THE soil-inhabiting grubs known as wire-worms are a problem the world over. The adult insect is a beetle, and belongs to the family *Elateridae*, or "click" beetles. The latter name originates from the beetles' habit of leaping into the air when lying on their backs, at the same time making a clicking noise. Most of the beetles are dull-coloured, considerably longer than broad, tapering towards both ends, and broadest at about one-third the length from the head (Fig. 1). When touched, they feign death, folding their appendages in such a manner as to give them the appearance of being a piece of dirt or a chip of wood.

There are many species of wireworms—Hudson, 1934, lists 147 species for New Zealand, only three of which are introduced forms—but apparently only a small number are important as pests. Detailed studies of these insects have been carried out in various countries, particularly those in the Northern Hemisphere, and the following information, although not referring specifically to our species, is in a general way just as much applicable to species infesting our farmlands or crops as to those found elsewhere.

The beetles lay their eggs beneath the surface of the soil, and in about a month the eggs hatch. The small grubs are at first whitish in colour, but as development proceeds the skin changes to the hard, shiny brown to dark brown, almost polished exterior surface, which is characteristic of wireworms. In shape, they are much like a piece of wire, being long and thin. The head is armed with strong jaws. The time taken for the wireworms to pass from egg to adult stages varies from three to five years, according to the species, but it is in the larval stage (Fig. 2) that most of the damage is done. The larvae live and feed mostly beneath the ground surface, feeding on the roots and underground stems of grasses and many other plants. They also attack other insects, and even other wireworms.

Wireworm Damage

Grasslands, and frequently rough grass, are infested by wireworms, and crops grown in such land are very liable to wireworm damage. Sometimes it is the first crop that suffers most, but not infrequently it is the second. This is explained on the grounds that the wireworms at first eat the turned-in turf, and, after having exhausted this supply, they then turn their attention to the crops. For example, a crop sown in grassland ploughed in the early spring may suffer less damage than the crop following it, but had the ploughing taken

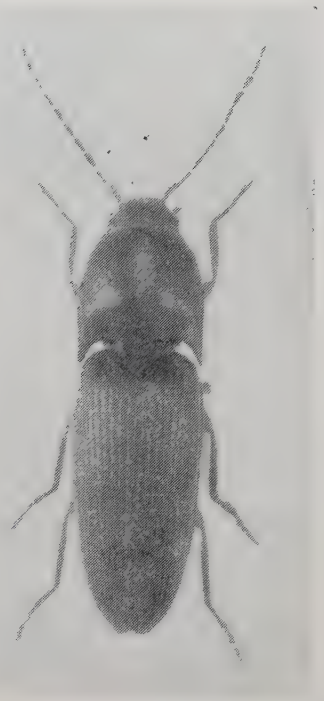

Fig. 1.—Wireworm beetle.

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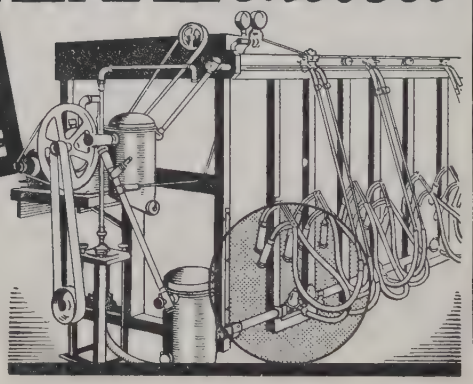

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Fig. 2.—Wireworm larva.

place in the previous summer, much of the turf would have had time to decay, with the result that the first crop would be likely to receive more damage than the crop following it.

A wide range of cultivated plants is attacked by wireworms. Crops such as beans and clovers appear to be less liable to attacks than others, although mustard, rape, and linseed are rarely damaged. Cereals appear to be particularly subject to attack by some species; the wireworms apparently burrow along the row from plant to plant, killing the plants as they go. Consequently, symptoms of their presence are a number of plants eaten out consecutively. Typical wireworm damage to wheat grains is shown in Fig. 3.

It is during the autumn and spring months that most of the damage results. With tomatoes and beans, wireworms may attack the plants near the surface of the soil and then burrow right inside the stems for some inches above the surface of the ground. Potatoes also are very susceptible to wireworm injury from the time they are planted until they are dug. Planting potatoes in an area infested with wireworms may mean the failure of the crop, as the larvae are quite likely to bore and tunnel the seed to such an extent that it is unable to develop. Again, feeding by the wireworms on the potato tubers after they are formed, especially by boring or tunnelling in them, may result in a considerable loss in their market value.

Importance in New Zealand

Injury caused by wireworms is not spectacular. Indeed, the reverse is quite the case, as over the last ten years the available evidence tends to show that wireworms in this country are not a major pest. The following are records of wireworm damage which have been referred to the entomologist during the past ten years:—

Locality	Crop	Remarks
Gisborne	Maize	Large portion of crop killed out. Trouble not previously experienced.
Christchurch	Tomato plants	Plants grown in glasshouse—stems eaten away below ground—following damage plant droops and dies.
Wellington	Spinach	
Gisborne	Beans	Canadian Wonder beans.
Blenheim	Potatoes	Injury thought to be due to wireworms.
Dunedin	Potatoes	
Christchurch	Tobacco	Soil sandy loam. 17 and 18 grubs to the square yard.
Marton	Flower bed	
Hastings	Beans	Attacked before the beans emerged above ground.
Rangiora	Potatoes	Injury thought to be due to wireworms. Potatoes followed wheat.
Blenheim	Lettuce	Crop of several thousand lettuces badly infested.

The insidious form of attack is such that damage from wireworms is seldom reported, and it is quite likely that a good deal of injury to crops at present attributed to different causes will eventually prove to be due to the presence of wireworms. Again, the fact that grassland was infested with them would hardly be noticed, although there are some suggestions that the running out of pastures is at least partially due to the presence of wireworms.

Control

Wireworms have various natural enemies, such as birds and insects, but what part these play in limiting or reducing wireworm populations is not known.

What appears to be a first essential in dealing with them is first of all a knowledge of the extent of wireworm infestation in the field before sowing it down. Hawkins (1936), for example, points out that there is a direct relationship between the number of wireworms present in the soil and the percentage of potatoes injured when grown in infested soil. In general, as the wireworm population increased, the percentage of tubers injured also increased. Consequently, his recommendation that a census of the wireworm population should be taken before the crop is planted is a question which could be profitably investigated in the event of their becoming serious pests in New Zealand. In the absence of actual data under New Zealand conditions, however, the following method as related by Miles, 1939, England, is cited:—

"The normal wireworm population consists of wireworms of all ages distributed irregularly over the field. Some information on the nature and density of the wireworm population may be obtained by sampling, but a considerable number of samples must be examined before any reliable estimate can be formed. A suitable sample is an 8in. square taken to a depth of at least 8in. Where even distribution is assumed and the average number of wireworms per sample is three, a population of about 300,000 wireworms per acre is indicated, a number sufficient to cause serious injury to crops. If small wireworms are abundant in the samples, wireworm injury may be

expected to continue for four years. Under any circumstances, injury should be anticipated for three years after grassland is ploughed."

In the event of fields being heavily infested, wireworm resistant crops, such as beans, peas, kale, mustard, or clovers might be sown, but certainly such crops as potatoes, maize, or cereals should not be used. In the event of it being convenient to fallow the field, this is effective only when followed by constant and thorough cultivation, as fallowing in itself is not considered effective.

That manure has any value in wireworm control seems doubtful; its main value would appear to be its effect on the crop in hurrying it forward to maturity. Kainit, however, used at the rate of approximately 5 cwt. per acre, is recommended by some authorities. Other workers differ, and in this connection Hawkins, J. H., loc.cit., in summing up the results of three years' field trials, was of the opinion that kainit cannot be used with any degree of certainty in controlling wireworms, although he found that it was in some measure toxic to them. In a small plot, heavy doses of kainit, say, at the rate of 3 oz. per square yard, might prove helpful. Apart from its manurial value, it also acts as an insecticide.

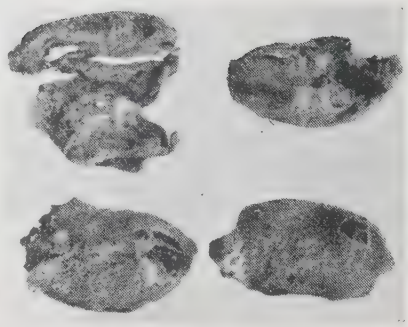

Fig. 3.—**Wheat grains which have been damaged by wireworms.**

Insecticidal control of wireworms appears to be beyond the bounds of economic possibility, although on a small garden plot where expense is not a deterrent some relief might be obtained by the use of a soil fumigant such as naphthalene. The naphthalene should be used at the rate of 3 oz. per square yard and dug into the soil when the wireworms are active. Care should be exercised when using it in this manner that it is not allowed to come into too close contact with growing plants, or injury may result to them.

Sprouting wheat has a particular attraction for wireworms, and this fact is used to trap them. The wheat is drilled in, and a short while after it has sprouted, calcium cyanide may be drilled in alongside of it at the rate of approximately ¼ of an oz. to a yard of "wheat row." Strict precautions, however, must always be observed when using calcium cyanide, as the gas given off may quickly prove fatal to human beings, or, in fact, to any warm-blooded animals. Again, another trapping method which can be adopted consists in putting pieces of potato, beet, or carrot on short sticks and burying them in the ground. The stick enables the trap to be lifted, and any wireworms attacking it can be destroyed.

References

Hawkins, J. H., 1936.—The Bionomics and Control of Wireworms in Maine.

Hudson, G. V., 1934.—New Zealand Beetles.

Miles, H. W., 1939.—Wireworms and the Breaking Up of Grassland.

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Production of Perennial Ryegrass Seed On Mixed Farms Is A Payable Enterprise

By A. H. FLAY,

Lecturer in Farm Management, Canterbury Agricultural College, Lincoln.

THE production of perennial ryegrass seed is not difficult. Pastures of this grass closed from stock for a few months in the late spring and early summer readily run to seed. In the past, discussion and thought concerning perennial ryegrass seed production seem to have been confined mainly to methods of harvesting, and a few years ago the merits or advantages of the header-harvester methods over the old method of the binder, stocking, and threshing, were common subjects for discussion. Today discussion centres around which header-harvester and which pick-up attachment is best or which method of cutting is best suited for the chosen header-harvester. Little attention seems to have been given to the methods of growing ryegrass for maximum seed yields over a number of seasons.

An explanation is probably that on most farms seed production has been considered a side-line. After the desired number of ewes and lambs were provided for, the paddock or paddocks considered best suited to give the highest yields were closed from stock when they could be spared. Usually, this meant that a first-year pasture was saved for seed. Such pastures always produce a certain amount of ryegrass seed without special management effort, but the yield under this hit-or-miss method may be considerably below the possible maximum.

Today, with the steady improvement in perennial ryegrass strains under the Government certification scheme, and with the sowing of costly high-grade seed, it is desirable and, in fact, almost imperative that maximum seed yields over several seasons be taken from areas sown in such seeds.

It is proposed in this article to discuss some of the factors responsible for high yields and successive seed crops of perennial ryegrass. The most important are:—(1) Soil fertility; (2) freedom from weeds and other plants; (3) method of establishment; (4) grazing; and (5) time of closing from stock.

Ryegrass Sown Pure or With White Clover

Perennial ryegrass sown alone on fallowed soil gives high seed yields in the first harvest season. With a high natural soil fertility, seed yields in subsequent years can be very payable, but in a few years, however, other species of grasses and clovers invade such a ryegrass stand. The practice of sowing ryegrass alone for seed production should be adopted only on good, clean land of high fertility. Where stock grazing and soil fertility building are important, pure sowings are not recommended. Now that the value of certified white clover as a soil-builder is recognised and maximum grazing, along with reasonable seed yields is keenly desired, few areas will be sown in perennial ryegrass alone.

Pure sowings of certified perennial ryegrass, to quote two examples which have been carefully recorded, have given the following seed yields:—

YIELD PER ACRE IN BUSHELS.

Harvest Years.	a.	b.
1st	25	32
2nd	14	25
3rd	19	18
4th	27	22
5th	11	—

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The grazing in (a) averaged 2½ dry sheep per acre over six years, including the period the pasture was closed for seed production, and in (b) just over three sheep per acre. The first area was on cropped-out land and no summer fallow. The second was on good land with a partial summer fallow. First-year crops on good land after a summer fallow have yielded as high as 50 and 60 bushels per acre.

Raising Fertility

Fertility, as required for seed production, may be raised directly by topdressing in September with nitrogen fertiliser. Increases in yield of seed from 5 to 11 bushels per acre have been obtained. From 1cwt to 1½cwt of sulphate of ammonia is the usual application, but because of the cost, few farmers use this manure today on ryegrass swards. When sown in the seed mixture certified white clover provides cheap nitrogen. The new pasture is topdressed liberally with lime and phosphate.

In the first harvest year, before the white clover is properly established, by virtue of the natural soil fertility and a summer fallow, a high yield of ryegrass seed is obtained. In wet seasons the white clover sometimes grows so rapidly in the first harvest year that it partially smothers the ryegrass seed and causes it to lodge badly. Such wet seasons are not common in Canterbury. Ryegrass-white clover sowings under liberal liming and phosphating and reasonably light grazing tend in the second and third harvest seasons to be dominantly white clover. If managed and saved for ryegrass seed, the yields are usually low because of white clover domination. Sometimes in the third, and usually in the fourth, harvest season on good land the white clover has so built up fertility that perennial ryegrass dominates. In these years fair yields of ryegrass seed may be saved.

Where white clover and perennial ryegrass are sown together on good land, the seed production position from the two species might average the following:—

YIELD PER ACRE.

Harvest Years.	Perennial Ryegrass (bus.)	White Clover (lb.)
1st	35	nil
2nd	8	150
3rd	12	80
4th	20	30
5th	16	20

These figures are representative of experiences on many areas, and in Canterbury rarely are more than five successive seed crops harvested from the one paddock. The grass-grub may partially ruin the sward, or undesirable species, including trefoil, browntop, twitches, Yorkshire fog, hairgrass, and goosegrass, may have invaded the sward to such an extent that at the end of five years it would no longer be suitable for ryegrass seed production. There is no control for grass-grub, but invasion by undesirable species can be delayed by sowing on thoroughly clean land. To assist here a succession of cleaning crops, such as potatoes, rape, roots, and greenfeed oats, may precede the summer fallow. On the established seed-producing area only hay absolutely free from Italian or perennial ryegrass (for example, lucerne hay) should be fed to stock grazing such areas in winter or early spring. Even the summer and autumn stock should not be shifted from roughage pastures containing undesirable species in seed head on to ryegrass seed-producing areas.

If ryegrass and white clover are sown together for seed production, it must always be realised that on good land one high-yielding ryegrass seed crop can almost certainly be relied upon in the first harvest year, but on the average in subsequent years white clover will tend to dominate for a year or two and then ryegrass will

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get the upper hand and hold it until other species make ryegrass seed production unprofitable.

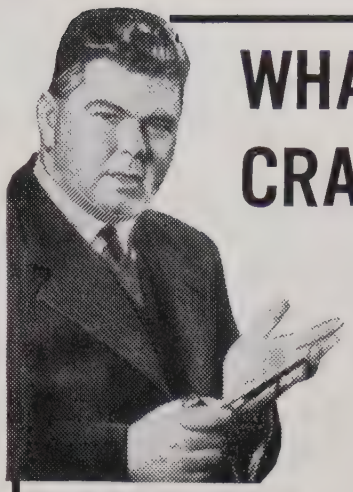
Grazing

For raising fertility, heavy winter grazing of perennial ryegrass is desirable. When sheep are fed an abundance of roots and lucerne hay on the perennial ryegrass area used as a holding paddock, much stock nitrogen topdressing results. This practice is especially valuable on pure stands of ryegrass. Heavy stock concentrations should be maintained for relatively short periods. Some farmers temporarily fence the seed-producing area into breaks to achieve short grazing periods and heavy stock concentrations.

Method of Establishment Is Important

As already mentioned, establishment after a summer fallow is the best for reliable maximum seed yields. Pastures are often sown, however, in other fashions, such as over a grain crop in the spring, with rape and turnips, with greenfeed oats, and so on. From a general farm management viewpoint, any of these methods may be profitable and desirable, but from a perennial ryegrass seed production point of view, they are not any more reliable than they are from a pasture establishment viewpoint. Often, the red clover smothers a possible seed crop. The oats in a greenfeed and new grass area may enable a light crop to be reaped, but the yield is low. Sometimes grass sown with turnips is thin, and so the seed yield is light. On heavy land rape may particularly smother the ryegrass and thus produce a thin cover and allow weed invasion later, but, on the other hand, on medium land a very payable seed crop may be saved in the first harvest year provided the rape is not sown thickly.

When pasture is sown by the above methods, ryegrass seed is saved as a catch crop. Such crops are saved usually only from first-year pastures, but there is one main exception. On medium to good land relatively free from weeds where perennial ryegrass and red clover are sown with grain crops, especially with barley in the spring, the red clover dominates the sward for the first year or two, raising the fertility. As the red clover is dying out in the third and fourth year, the ryegrass becomes dominant, and often gives fair yields of 15 to 25 bushels per acre. In the fifth season



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Similarly with the Japanese. The Mikado started off with a rush, but, now that he is up against trained whites and not unarmed Asiatics, he will soon be going the other way.

Now let us look at what we have gained. We have got the better part of North Africa and West Asia, and, most important of all, we now have a united and well-armed Empire, together with a couple of substantial allies. Taking it all round, we have got no reason to cry stinking fish, and jolly soon things will be much better.

Now let us look at our own internal position. Our job here is to produce. Don't adopt the fatalistic attitude of saying, "What's the use, we might not get our primary products away." Actually, with the exception of apples, every year we have got away more than ever before; and, just recently, in addition, we have even managed to make the happy exchange of two of our Cabinet Ministers for an eminent American and an outstanding Canadian; so I don't think we need worry about any shipping problems. Taking it all round, we are doing quite all right.

Our real concern here is to retain our pastures and keep up production. Granted, fertilizers have enabled us to produce more per acre, but, at the same time, they have made us forget about fertility by cultivation, which enabled our ancestors, who had no artificial fertilizer, to retain pastures and quality stock in the old countries of the world for thousands of years.

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Mr. W. R. Treadwell, of Takapau, Hawke's Bay, on 15/4/41, writes:—

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hairgrass or other undesirable species are usually found to be invading the area, which nearly always prevents more than the two ryegrass seed crops being taken.

Time of Closing From Stock

For maximum seed yields, the time of closing from grazing stock is important. Too often, farmers close up their paddocks late. Certainly, lodging on a large scale is to be avoided, but a little lodging is desirable. It means that the maximum readily harvested seed yield is being secured on that soil in that season. If a reliable forecast of the rainfall could be made, the time of closing would be comparatively easy. Theoretically, the area should be closed from stock just before the plants begin to produce seed stalks. On heavy land in a high state of fertility, this would be too early, and on light land it is too late. On good land the crop would almost certainly be hopelessly lodged, and on light land the yield of seed would be lower than if closed earlier. However, experience has shown that in the average Canterbury season certain approximate dates for closing up perennial ryegrass from stock for seed production can be given.

On good plains land with first-year crops sown after a summer fallow, closing should take place between October 16 and 24. With poorer crops and lower fertility soils, closing should be not later than mid-October, and on real good land between October 20 to 28. Along the Canterbury foothills at 800ft. to 1200ft. altitude on similar soils the closing should be about ten days to two weeks later.

On medium soils with a first-year crop sown after a summer fallow, remove all stock between October 6 and 12. On light land under similar conditions, remove all stock between September 24 and 30.

For subsequent seed crops only good soils and the better medium soils need consideration. In general, on these soils, second and subsequent seed crops should be closed three to four weeks earlier than would be done for the same area in the first harvest year. Subsequent crops are always difficult, and much depends on the clover-content and the species of clover. If there is little or no white or red clover, then mid-September is the closing date. For weaker stands, close early in September and vigorous areas late in September or even early in October. These remarks apply only where maximum yields of ryegrass seed are aimed at. Where white clover dominates in the second or third year, ryegrass seed as a crop is out of the question. The area should be managed for the production of white clover seed.

These dates for closing for maximum ryegrass seed yields have been found most reliable over many paddocks and soils throughout Canterbury during the past twelve years. Admittedly, lodging has sometimes taken place on heavy land, especially where white clover has established quickly or where red clover has been present to any extent. With white clover and a wet season, a good deal of lodging is inevitable, and even without the presence of clovers in wet seasons on good soils, much lodging has occurred. Canterbury, however, is relatively dry normally, so that a normal closing date must be adapted for maximum seed yields on average. These remarks apply only to genuine or true perennial ryegrass.

Mowing or reaping should be delayed as long as possible without the loss of seed. Mowing for the header-harvester tends to be carried out slightly earlier than the stage at which a crop should be reaped. The difference, however, is not great. The point is to reap when a few seeds fall out fairly readily, and when examination of the

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seeds themselves reveals that a proportion is turning brown.

Summary

Certified perennial ryegrass seed production on one or more paddocks on all mixed farms is a payable enterprise. The higher grade strains are the most profitable. Generally, maximum seed yields are desired, and these can be obtained with the highest degree of reliability by sowing a perennial ryegrass seed mixture containing a small quantity of white clover on clean land after a summer fallow. Other methods of sowing are useful under certain conditions. A high yield of ryegrass seed will be obtained in the first harvest year. Liberal liming and topdressing will enable the white clover in the mixture to raise the fertility of the land over a year or two, with subsequent fair yields of ryegrass seed, during which time white clover seed production may be attempted. Winter stock concentrations assist in raising fertility for seed production.

Late closing from grazing stock is a common error, and applies particularly to areas saved in other than the first harvest year. In the first harvest year closing should take place early in October on medium soils and in the third week of October on good soils. Foothill areas are a week or two later, and areas for second, third, or other seed crops should be closed about mid-September.

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Radio Broadcasts.

RADIO talks to farmers will be given from Station 1YA, Auckland, at 7.15 p.m., on the following dates:—

June 1.—"Seasonal Notes for the Month," by the Fields Division.

June 8.—"Care and Management of the Horse," by Mr. H. W. Carbury, M.R.C.V.S., Veterinarian, Department of Agriculture, Auckland.

June 15.—"Development of Marine Flats," by Mr. C. Walker, Instructor in Agriculture, Department of Agriculture, Thames.

June 22.—"Young Farmers' Club Session," "Citrus Culture in the Home Orchard," by Mr. A. M. W. Greig, Citriculturist, Department of Agriculture, Auckland.

Pig Industry Broadcasts.

UNDER the auspices of the District Pig Councils concerned broadcasts will be delivered in June as follows:—

1YA, Auckland, June 18, 7.15 p.m.—"Crops for Pigs," by A. H. Preston, Supervisor, Northland District Pig Council.

2YH, Napier, June 11, 7.30 p.m.—"Spring Litters," by I. H. Owtram, Supervisor, Tairawhiti District Pig Council.

2ZA, Palmerston North, June 16, 8.30 p.m.—"Common Ailments," by L. L. Marsden, Supervisor, Wellington District Pig Council.

4YA, June 8, 7.15 p.m. — "Creep Feeding," by N. Macdonald, Supervisor, Otago and Southland District Pig Council.

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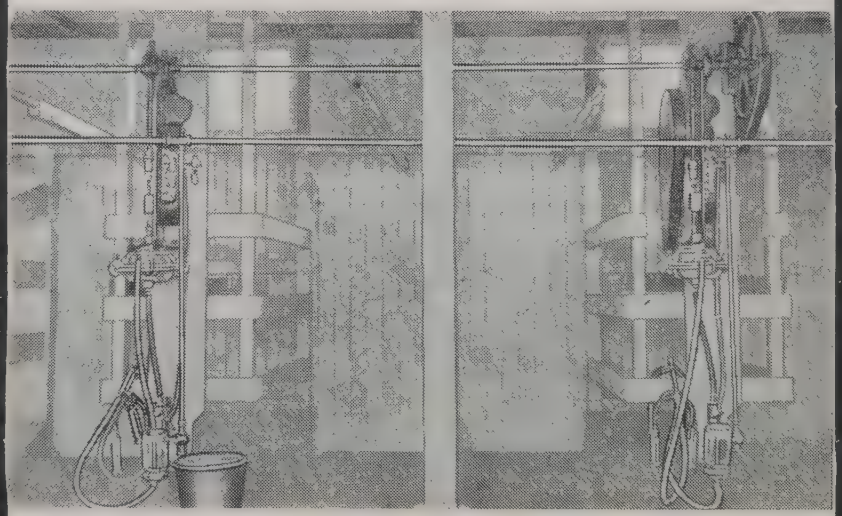

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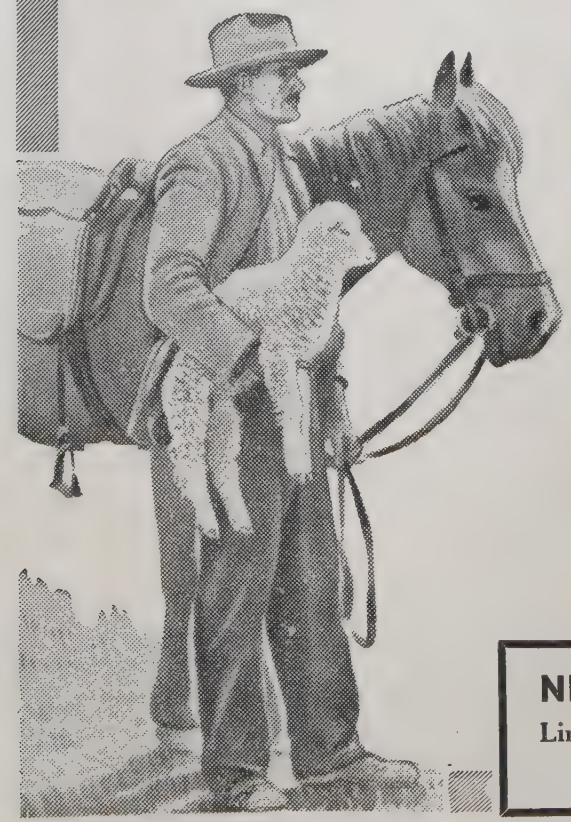

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Veterinary Notes for the Farmer

Abortion in Cows

Contributed by the
LIVESTOCK DIVISION

AT this season of the year many dairy farmers are likely to experience cases of abortion and premature births occurring amongst members of the dairy herd. May is a common month for such happenings, when the normal calving is not expected to take place until about July or August, or even later in individual animals and herds. Such premature births may then be considered to take place from the sixth month of pregnancy up to within a few weeks of full time. A common time is between the seventh and eighth month of pregnancy. It is the general experience of dairy farmers that more slips take place among two-year-old heifers than in the older members of the herd.

What, then, is the explanation for the repeated occurrence of aborting heifers and cows in so many herds? Sometimes owners do not wish to admit, even to themselves, that the disease of contagious abortion exists in their herd, and consequently abortions are explained away as being due to some of the many other causes which may bring about abortion. Thus we hear of slips being referred to as a minor happening, due to eating some disagreeable foodstuff, such as frosted roots or mouldy hay or the eating of some harmful or poisonous plant.

Slips are also not infrequently seen after animals have completed a long journey either by road or rail. Abortion may occur following acute indigestion with bloat, but bloating is comparatively rare at this season of the year. Rough handling of young dairy stock by dogs going to and from sales, or accidents or falls on the road, may account for an occasional premature birth.

After making due allowance for all causes of this nature there are still many abortions which occur in normal apparently healthy animals in good condition which have not been disturbed in any way whatever. These so-called unexplained cases constitute by far the greater percentage of the total number of abortions occurring each year in our dairy herds.

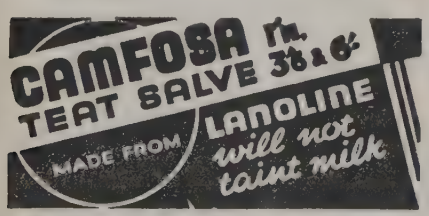
Contagious Germ

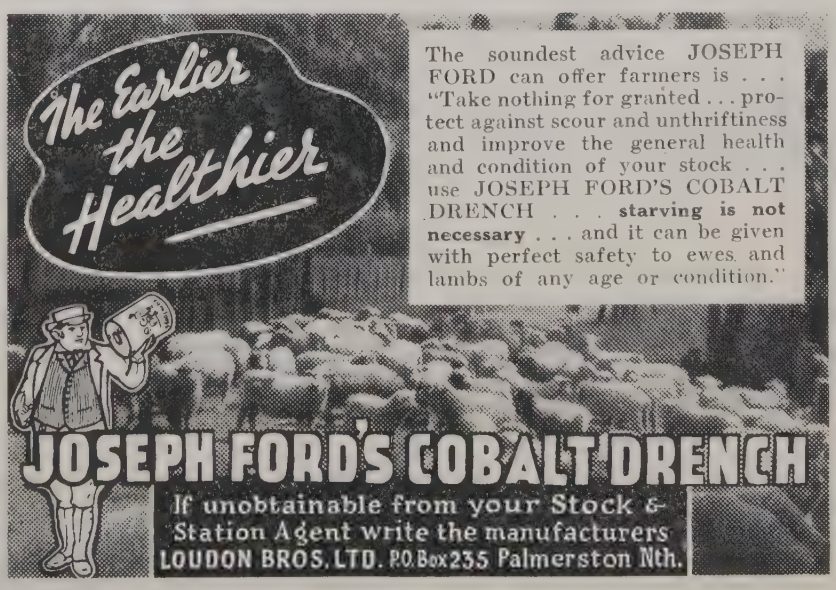
These animals are infected with the specific germ of contagious abortion, and blood samples collected from such animals prove them to be so infected. The contagious abortion germ is picked up by susceptible animals from contaminated grazing or water supply. The germ finds its way to the pregnant womb, where it sets up a slow-acting chronic inflammation, which interferes with the normal full development of the foetus in the womb. Eventually the blood supply to the foetus is cut off or so seriously impaired that the result is a premature expulsion of the foetus, and abortion, or more commonly described as slipping.

At the time of abortion the membrane and discharges are teeming with the organism responsible for the disease, so that immediate steps should be taken to isolate the aborting animal, and deal with the foetus and discharges by burial or burning. In many cases of abortion the membranes are retained for some days, and during this time there is frequently a profuse discharge of a brownish thick fluid which is infective for other stock grazing contaminated pasture or drinking infected surface water.

As it is impossible to deal with such discharges while the animal is at pasture with the herd, an isolation paddock would appear to be essential for all aborting animals. Periodically the paddock, if a small one, could be searched, cleaned up, and all membranes and discharges either buried or burned. In fact, an animal suspected as being about to abort should be placed in the isolation paddock for observation or as a precaution to prevent spread of infection in the clean paddocks or through other members of the herd.

Special treatment of the aborting animal is necessary. If the membranes

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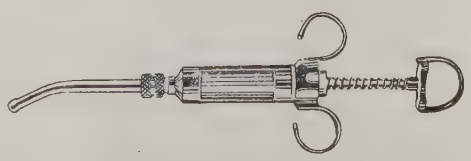

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are retained regular daily douching will require to be carried out in order to assist in their removal. A lukewarm salt solution, a tablespoonful of salt to a gallon of boiled water cooled to blood heat, will be found useful. If an attempt is made to remove the membranes by hand care is necessary to see that the membranes are removed in their entirety, that no small pieces are left behind. Regular douching will assist in this respect. The hindquarters and tail should be thoroughly washed down and kept in a clean condition. If special trouble is taken to clean up and remove all debris from the womb at the actual time of abortion, less trouble will be experienced later on from sterility when next breeding season approaches.

An animal which has aborted should not be bred again until at least two months after all discharge has ceased.

Answers to Correspondents

Throat Injury in Heifer

E.C.M. (OHAUPO):—

A few weeks ago we had a heifer die, and as we now have another that is showing the same symptoms, I wonder if you could tell me the nature of the complaint and the treatment for it. The heifer was first noticed standing around with her head stretched well out, breathing very heavily, with a slight discharge from the nostrils. The eyes were very dull, and there appeared to be a swelling on the nose. The heifer showed these signs for about a week, and then rapidly lost condition and died about a fortnight later.

LIVESTOCK DIVISION:—

There has evidently been some severe injury in the throat region, resulting in infection or abscess formation. This may be caused by some foreign substance, such as a piece of bone or a piece of turnip becoming lodged at the back of the throat. The subsequent symptoms would develop either from its continuous presence there or from injuries inflicted in its removal.

However, in the absence of further particulars regarding the symptoms it is practically impossible to determine the actual cause, an examination of the animal itself being the only satisfactory procedure to adopt.

It is advisable in all such cases to notify the Inspector of Stock for your district, when both an ante-mortem and, if necessary, a post-mortem examination can be made.

Rye Grass Staggers

"A.E.B." (Papakura):

I am writing for some advice regarding trouble I am having with ewe hoggets.

The trouble is that the mob is affected with a form of fit. When they attempt to run they go stiff all over and fall down. Some will turn somersaults and lie for a few minutes and quiver and shake all over. So far I have lost seven from a mob of 130.

I have noticed two Southdown hoggets also affected. The ewe hoggets were in a paddock of young grass that had gone to seed and were done fairly hard for a week. The Southdowns were on the best of feed, as I am fattening them.

Prior to this trouble there had been a dry spell for nearly three months, and all grass was very dry. All stock had plenty of water.

The flock was so badly affected that I was unable to drive them. This was ten days ago. Since then they are no worse but are very difficult to drive. None of the ewes on the farm are affected.

LIVESTOCK DIVISION:

Your sheep are affected with what is commonly called ryegrass staggers, a complaint that is quite common in a year such as this when most pastures have been very dried up. The actual cause is not known but the condition you describe, young grass that has gone to seed, is typical of the conditions under which the trouble most commonly occurs.

No treatment is necessary; in fact, the affected flock should be left alone as much as possible, and not mustered up and driven. A complete change of pasture is advisable, but in moving the flock the gates should be left open and the sheep allowed to drift through themselves and not hustled along. The trouble does not, as a rule, last more than a week or two when the affected animals fully recover.

Advisory Service on Veterinary Matters.

Farmers are invited to submit inquiries connected with the health of their stock, and the replies will be published under this heading.

Mineral Deficiency in Cow

J.D. (RAGLAN):—

One cow developed lameness or appeared to be sore in the feet during the spring, and has since progressed into a chronic state, where it can walk only with difficulty, and gives the impression of a rheumatic condition.

The muscles on the rump appear to have wasted, the back is arched, the hooves (particularly the front) are long, and the animal walks jerkily, using the heel of the foot, and seems proppy moving or standing. The joints do not appear to be swollen.

Could this be due to an injury to the hoof, muddy conditions in a wet season, or a mineral deficiency? Three or four other cows are similarly affected, but not to the same extent

LIVESTOCK DIVISION:—

From the symptoms described, there is little doubt that a mineral deficiency

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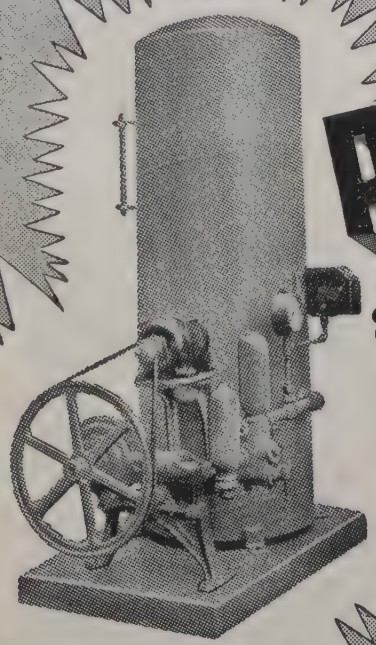

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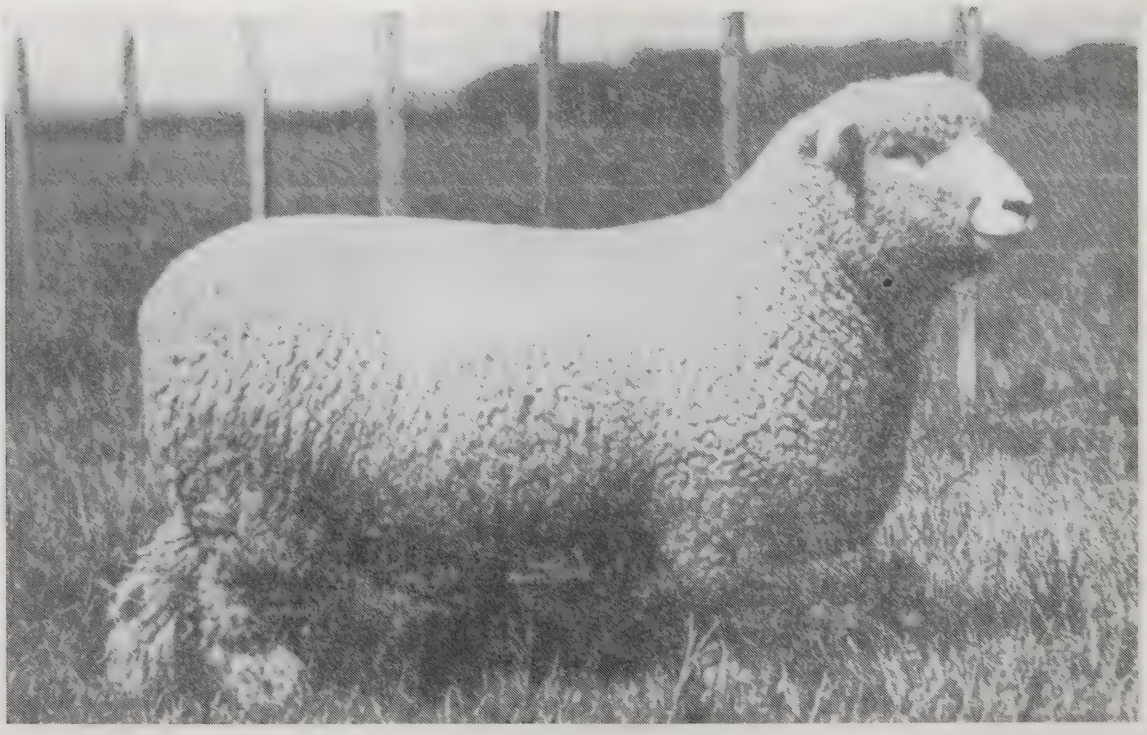

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... the cause of the trouble. A lotion made up as follows will prevent the occurrence of any further cases, its curative properties, however, will depend on the extent and duration of the lesions in the affected animals:—

Permanganate of potash	20 parts
Salt	20 parts
Lysol	15 parts
Boracic acid	15 parts
Water	1000 parts

Permanganate of potash is more effective than as a rule than permanganate.

Treatment of Cow Pox

"NEW CHUM" (DANNEVIRKE):—

I should be very grateful for information on the following points concerning cow pox, and hope I am not asking too much.

(1) What is the cause of cow pox, and is it preventable?

(2) The best cure for cow pox.

(3) Can cow pox break out on other parts of the cow's body than the udder? On the inside of one of the cow's legs the hair seemingly shows signs of the trouble, and I wondered if it was on the leg but had been caused by rubbing.

(4) Our weather has been wet for some time, and I was informed that the long wet grass, etc., coming in contact with the udder causes irritation to the trouble and thus it was advisable not to bathe the sores. Is such the case?

LIVESTOCK DIVISION:—

(1) True cow pox is due to a virus which is capable of being spread from cow to cow by milker's hands, machine cups or other intermediary. Where a case occurs, spread can be prevented by proper precautions. In hand-milking, a bucket of suitable antiseptic such as one of the hypochlorite preparations, should be available to rinse hands after each cow. Separate washing cloth should be used. If machines are used, affected cows should be milked last and cups immersed in similar solution, and then in clean water after each affected cow, and finally properly sterilised by boiling water or steam.

(2) For treatment, use any suitable mild ointment, such as zinc ointment, applied to sores after each milking. The main points are: (1) To avoid any undue injury to the sores by rough milking (therefore milk with the whole hand and do not strip teats down with finger and thumb); and (2) avoid secondary infection from dirt, etc., which delay healing. It is quite a good plan to bathe with the antiseptic solution and dry before applying the ointment.

(3) It is possible but rare for cow pox lesions to occur on the inside of thighs. These may be due to a different cause and I would advise bathing with antiseptic solution and applying ointment.

(4) The influence of wet grass in itself should not be harmful, but mud and dirt cause secondary infection of sores and delay healing.

Seed Potato Certification.

FOR reasons of economy, the list of growers whose potato crops have been provisionally certified by the Department of Agriculture will not appear in the "Journal" this year. Copies of the list will be available on request from local offices of the Department, however.—Fields Division

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Farm Practice and Management

Electric Motor Replaces Petrol Engine To Operate Hay Press

ALTHOUGH farm labour is now short and is likely to be more so in the future farmers who in the past have found that the use of hay in bales is most valuable and economical are emphatic that the practice must be continued. On the farm the conservation of petrol is not only gained by cutting down or eliminating operations requiring motor spirit but also by using alternative sources of motive power.

During the present haymaking season it has been possible, with the co-operation of the engineer to the North Auckland Electric Power Board, to test out the use of the electric motor in place of the petrol engine for working the hay press on the North Wairoa Experimental and Demonstration Farm at Dargaville. The power lines pass through the farm, and fortunately this year it so occurred that the hay fields were under or alongside this line. The petrol engine was removed from the hay press, and a 2-h.p. electric motor substituted. The press was then, when the hay crop was ready, set up alongside a convenient power pole, and the electric motor connected by officials of the power board to the power line. Details of the outfit as set up are shown in the accompanying photographs.

Showing how the electric motor is plugged into the power lines to substitute for the petrol engine in operating the hay press.

In certain fields it was necessary to sweep the hay to the press for a greater distance than would have been necessary with an independent source of power. In one field, where the power lines passed through the centre, the press was set up alongside a pole in an ideal position for working the paddock. Through a shortage of suitably protected cable, no attempt was made to convey the electric power temporarily to another field away from the power line. In normal circumstances it would be quite practical with a suitable cable to set up the press in the most convenient site for working in the field, and also to run the temporary line to other paddocks even up to 10 chains away.

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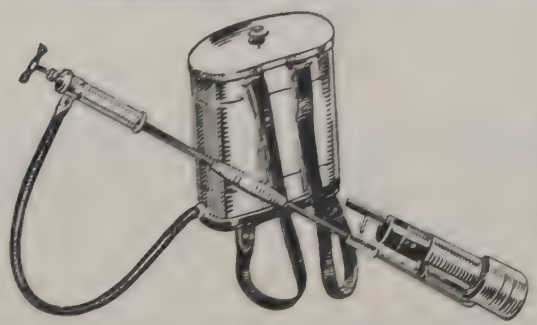

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A CHEAPER, SIMPLER, EASIER WAY TO ERADICATE NOXIOUS WEEDS.

The results of the tests proved highly satisfactory. On farms where power lines are suitably situated, the electric motor can take the place of the petrol engine for pressing hay. The press used was ordinarily driven by a 2½-h.p. petrol engine, and although the 2-h.p. electric motor performed the work satisfactorily, it is intended to carry out further tests with a larger sized motor. Working with the outfit in one field, ten tons of hay were pressed in approximately ten hours, and the consumption of power was only eight units.

The use of the electric motor for baling hay can well be envisaged in the near future on farms where electric power lines are conveniently situated. The cost of installing permanent power points on suitable poles for plugging-in a protected cable carried on temporary supports to convey the power to the press would soon be repaid.

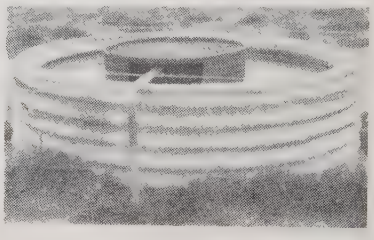
Thanks are due to the engineer to the North Auckland Electric Power Board, Mr. T. Overton, and also to his staff for the valuable assistance in carrying out these tests.

—E. H. ARNOLD, Instructor in Agriculture, Dargaville.

Protecting That Ball Cock

WHETHER the supply pipe in the drinking trough comes over the top of the concrete trough or enters at the bottom, there is always trouble with the ball cock. Some stock are fond of amusing themselves by testing the ball cock from time to time, resulting in much annoyance and expense.

The method of protection such as is illustrated has completely solved the difficulty for one farmer. A 45-gallon drum is cut, as shown, to the appro-



priate size and placed over the pipe and ball cock and secured in position by a wire. With two bolts or wires imbedded in the concrete, the wire will more firmly hold the drum in position. In this case, the drum has even prevented an old sow from taking her daily bath in the trough.

—J. R. MURRAY, Instructor in Agriculture, Whakatane.

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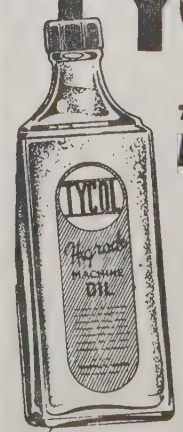

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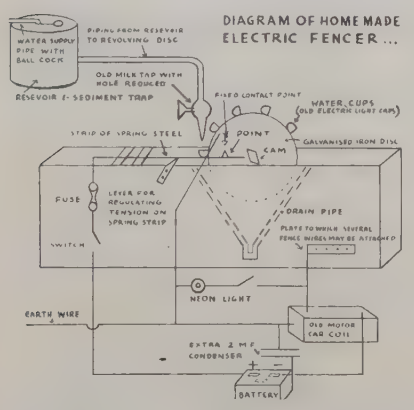
The description of the outfit is as follows:—A small water wheel, driven by a trickle of water through a 1-8-inch pipe, turns a cam, which interrupts the current from the battery to the coil.

The water wheel can be made from a circular disc of flat galvanised iron 18 inches in diameter. Little cups are soldered on the rim at regular intervals, about three to four inches apart (for want of something better Mr. Molloy used the brass bases of old electric light globes as cups).

Sweated, soldered, or otherwise fastened to the axle of the disc is a cam. This is made by using a square nut from which two of the opposite corners have been filed off. When it revolves, this cam depresses a springy strip of metal (for example, an old hacksaw blade, tested for spring) to



which one of the contact points is attached half an inch from the end. After depressing this springy strip the revolving cam allows it to flick back again. As it flicks back into its normal place of rest it makes a very momentary contact with the other contact point (see diagram). Suitable points may be obtained very cheaply at any garage.

The tell-tale light is very simple, true, and sensitive. An ordinary household neon light is used, which may be purchased at any electrical supplier for about 3s. They are frequently used as pilot lamps in hospitals and sick rooms, and are also used by electricians for testing purposes.

The lamp (230 volt, 15 watt) is mounted on a socket having one of its two wires permanently earthed. The other end, with a little of the insulation stripped off, is left loose.

To test the fence, simply hold this loose end on the fence terminal. If the lamp flashes, the fence is working satisfactorily; if there is no flash, the fence wire is down or shorted; if there is a poor flash, there is a partial short.

To make quite sure that the lamp is in order, leave the loose end on the fence terminal and disconnect the fence wire, when the lamp should flash each time. If the fence is quite all right, the lamp should flash just

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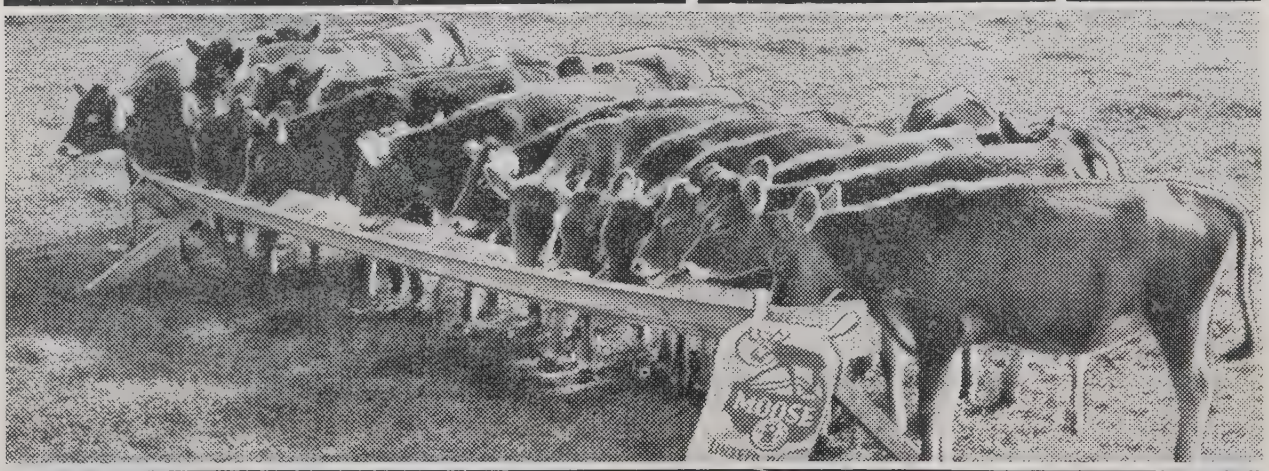

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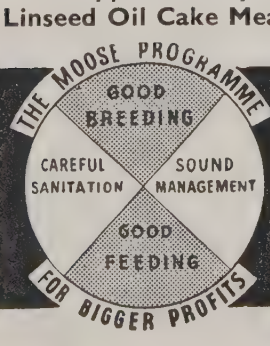

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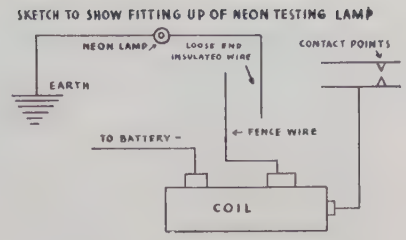
as brightly with the fence connected as it does when the fence is disconnected.

The light is not continually left in circuit, for it would absorb too much power. It must be placed conveniently so that the circuit can be tested without loss of time.

The coil is out of an old car. An extra condenser, mounted as shown, will give a considerable boost to the spark. The earth, however, must be good.



The accompanying diagram should make the method of construction very clear, and the writer can vouch for the efficiency and utility of the outfit.

In conclusion, I should like to thank Mr. Molloy for placing details of the construction at my disposal.

—A. V. ALLO, Instructor in Agriculture, Tauranga.

Quick and Handy Method of Feeding Pigs

ON many farms the feeding of skim-milk presents difficulties which may become burdensome. For instance, those who are unable to lift heavy weights find difficulty in carrying or bucketing the skim-milk from the vat to the trough. Often, too, quite a considerable time is spent in bucketing the milk to all the troughs when a large number of pigs are to be fed.

To overcome this backbreaking task and to assist those women who, in large numbers, are taking their places on farms, a layout such as that illustrated solves the heavy lifting part admirably. The vat is raised on a stand about five feet, and with two or three large taps, as shown, the skim-milk can be directed into wooden chutes, which carry it to wooden holding boxes above the pens. From each of these boxes, in the appropriate positions, pieces of down-piping (1¼in. or 1½in. in diameter, preferably) are attached to lead the milk direct to each trough below. Rubber stoppers are used to cut off the flow to each trough, although wooden stoppers would be equally effective. The close-up view reveals the method of using the down-piping from the holding box to the trough.

Under the stand for the vat can be stored what meal is required, or other

A close-up showing the method of using the down-piping for directing the milk into the trough. Three pens are supplied from this end of the holding box.

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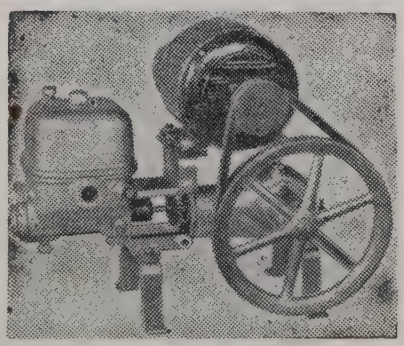

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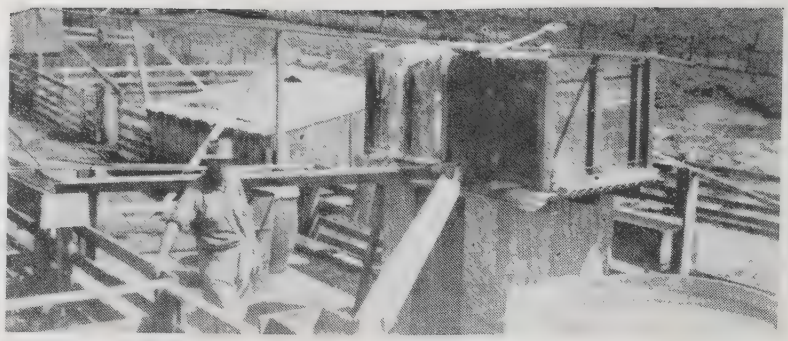
accessories to the piggery. It may be seen, however, that the pens must be relatively close together, as in this case, when one holding box can serve several pens. The layout most suitable for this method, of course, would be one where all pens radiate from a central feeding system, or where fattening pens are fairly close together. Feeding by this method may be carried out with ease in one-quarter of the time required for bucketing the milk to each trough. It will be readily seen, however, that unless the chutes and the boxes are occasionally washed to keep down bacterial infection, sickness may break out among the pigs.

The layout illustrated shows a tank on ground level for holding water for washing purposes. By screwing a short additional length of piping on to the pipe supplying the vat, water can be pumped from the shed whenever required.

—J. R. MURRAY, Instructor in Agriculture, Whakatane.



The pig-feeding layout. The vat is raised on a stand, and large taps are fitted to direct the skim-milk into the chutes which convey it to the holding boxes over the pens. Note the tank at ground level to hold water for washing purposes.

World's Largest Wheat Order

THE United Kingdom's Ministry of Food, largest buyer of wheat in the world, has broken its own record with an order for 120,000,000 bushels (about 3,000,000 tons) placed with the Canadian Wheat Board.

The previous largest purchase was of 100,000,000 bushels, ordered by the Ministry in 1940. The new consignment is to be delivered during the twelve months ending May, 1942.

Reckoning 563 4 lb. loaves to the ton of wheat and using white flour of 75 per cent. extraction, this will provide Britain with 3,378,000,000 of the 2 lb. loaves her housewives favour. There will also be 750,000 tons of wheat-feed in the form of bran, middlings, and wheat germ meal for Britain's dairy cows, beef cattle, pigs, and poultry.

If the wheat is converted into 85 per cent. extraction national wheatmeal flour, 4,080,000,000 2 lb. loaves would be produced, but only 450,000 tons would be available for livestock feeding.

As Britain does not at present make more than 10 loaves in every 100 from the higher extraction flour, a total of 3,448,200,000 loaves, representing about 9,500,000 loaves a day for the twelve months, is what Britain will obtain from this order.

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In the Orchard and Vineyard

Orchard Notes

Preparations for the Winter Season

THE value of orchard records should be appreciated by all growers, for by this means he will be able to decide which trees should be removed, specially treated for disease, heavily pruned or otherwise, or, if of inferior value from the marketing point of view, cut down preparatory to grafting when the appropriate season arrives.

After the Harvesting

If autumn planting of fruit trees is contemplated, the work should be completed before the end of May, otherwise planting should be deferred until the spring, when the land becomes reasonably dry and warm, in order that trees may quickly establish themselves. The selection of trees for replacements and new plantings should be given full consideration.

Pruning

The most important operation in the orchard during the next two or three months will be the pruning of stone and pip fruits, and an early start is advised. A successful pruner should possess a good knowledge of the basic principles governing the development and maintenance of a healthy tree capable of producing good average growth every season, and the necessary fruiting wood on which to carry an annual crop of first-class fruit.

Stone Fruit— Peaches and Nectarines

As the peach and nectarine have similar growth and fruiting habits, the same style of pruning is applicable to both. These trees produce their fruit on the previous season's growth and in order to obtain the maximum results a constant supply of young wood and spurs is essential. This can best be obtained by a judicious thinning out of wood growth during the pruning season. Many of the stronger laterals should be suppressed entirely in order to induce further development of new growth during the following season. The usual practice with the shorter and weaker one-year-old laterals is to leave them entirely, allowing them to fruit the following season, and then remove them. As peach and nectarine trees usually come into bearing at an early age, the aim should be to provide the tree with strong leaders capable of producing good fruiting branches, which in turn will be able to carry average crops of fruit for many years. The number of leaders required to form the tree depends largely on the type of soil in which the tree is planted. With vigorous growth during the first few years a tree with too many leaders is apt to become overcrowded and produce wood which is sappy and immature, to the detriment of fruiting.

Judicious Cutting

Leaders chosen when first planting the tree are maintained throughout the lifetime of the tree. By a medium cut of the leaders, the cutting back or suppression of any heavy laterals and leaving intact small lateral growth for fruit production, the tree will become furnished with healthy growth and fruiting wood from top to bottom. If the top of the tree becomes overcrowded with growth, the laterals and fruiting wood in the lower parts of the tree will die out, leaving bare poles. Pruning for fruit on peaches and nectarines is a series of replacements, cutting out every season two-year-old laterals that have fruited and leaving the one-year-old laterals to carry on.

Apricots

The apricot, if planted in suitable soil and situation, is a strong grower during the first few years until it has settled down to fruiting. A strong framework should be developed by fairly heavy cutting, after which pruning may be considerably modified as far as leaders are concerned, severe cutting being necessary only when the annual growth begins to slacken. The fruit is carried on short spurs which develop all along the main leaders and heavier laterals. Long and heavy lateral growth should be shortened to

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within a few buds of the base every season. Short laterals and fruit spurs need not be touched until after bearing, when they should be cut back to make room for a further supply of fruiting wood. As the tree ages and bears heavily, leader growth will slacken and it will be necessary to prune heavier to encourage new growth, without which fruiting laterals or spurs do not develop.

Cherries

Very little pruning is necessary with the average cherry tree when once it has become established and fruiting begins. The cherry tree is very subject to gumming and heavy cutting accentuates the trouble. The majority of the fruit is carried on the spurs from one to three inches long. These spurs are produced on two, three, and four-year-old wood and will continue to develop almost to the end of the branches. The aim of the pruner should be to develop as many of these spurs as possible, allowing them to produce their fruit until they become old and knotted, after which a judicious thinning out and renewal is necessary. The cutting out of any large limbs, cross branches, etc., should be done soon after the crop has been harvested, as the wounds heal more rapidly at this time. All wounds should be well covered with an antiseptic dressing to prevent the entrance of disease.

Plums

Plum trees, both European and Japanese, are strong growers when young. After the young tree has been shaped by fairly hard cutting of the leaders, it is not necessary to prune so severely, more attention being given to the fruiting habits. On European varieties the fruit is borne on the laterals and spurs of two years and older, whilst in Japanese varieties the fruit is carried on the spurs and laterals of the previous season's growth as well as on older wood. The system of pruning consists mainly in the elimination of old worn-out laterals and spurs, replacing them with young fruiting wood. Spur clusters should be well thinned out and laterals not required for fruiting removed from the base.

—G. STRATFORD, District Supervisor, Horticulture Division, Dunedin.

Citrus Notes

Marketing of Citrus Fruits

ONE of the most severe handicaps to the successful marketing of citrus fruits is wastage. Wastage is anything that results in loss—the loss of fruit, the loss of time, the loss of money. Wastage is expenditure to no purpose or inadequate result.

To reduce wastage, citrus fruits must be grown free from disease. Of what use is a good crop if it is covered with citrus-red-scale or verrucosis, or on reaching maturity collapses with brown-rot, wither-tip or stem-end-rot? If not already applied, do not further delay the autumn application of Bordeaux spray at a strength of 3-4-50, i.e., 3 lbs. Bluestone, 4 lbs. Hydrated lime, to 50 gallons of water.

Correct harvesting is the next important point. Sweet oranges, marmalade "oranges," New Zealand grapefruit, and mandarins require particular attention. The harvesting period for mandarins is often very short, for if too long delayed many soon dry out. To enable most of the crop to size, the larger fruits should be picked when ready for market as judged by juice and palatability. For marmalade purposes citrus fruits should be picked when fully coloured, while for dessert purposes they should also be mature. Although juice content and rind thickness can be improved by keeping after picking, the sugar content remains the same; therefore sweet oranges, mandarins, or New Zealand grapefruit should not be picked until they are palatable. Take every opportunity to improve the name of locally-grown citrus fruits by care in harvesting. Harvest lemons monthly. That doesn't mean that consignments should be sent in to the local depot only once each month; it means that every tree must be inspected monthly and all fruits at the correct size and stage of maturity picked. The ideal fruit is the 2¼-inch diameter lemon, silver green in colour. In picking, both size and maturity must be considered. All fully-coloured lemons should be harvested; also silver and light green lemons provided they are over the 2¼-inch diameter size.

The first cut in picking a lemon.

The second cut in picking a lemon.

The second cut completed.

[H. P. Bryan photographs.

A mistake frequently made in harvesting lemons is to pull the fruit instead of cutting it. Pulling is resorted to by some growers when the fruit is over-mature, or the secateurs are not in good cutting condition, or to gather the fruit from branches out of reach. This should be avoided with citrus fruits on all occasions. A small "walking stick" with curved handle is often useful for bringing the fruit nearer for picking. Another frequent mistake when cutting is done is to be careless in cutting and to leave projecting fruit

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stalks which, often cut at an angle, result in sharp points liable to inflict injury on other fruits. Remember the harvesting of citrus fruits requires a double cut. Much of the dead and weak growth in citrus trees would be obviated if the first cut was made with greater care back to healthy fruiting wood. The second cut should be close up to the button. It is better to cut the button slightly, rather than have a projecing stalk.

Field cases should be strong, easily handled, and free from all nails, splinters, or dirt, and when not in use should be stored under cover and not left lying out in the orchard. A suitable field case cleated at each end and having an inside measurement of 11½ x 12 x 18 has been designed by the Department. When filled to within one inch of the top this is equivalent to a loose bushel. Fruit unsuitable for marketing, owing to disease or malformation, should be placed in a separate tin or case in the orchard and later buried. The cartage of reject fruit and its handling in the packing shed prior to being discarded means wasteful expenditure. Fruits should be carefully emptied from picking bag into the field cases and not dropped or carelessly poured in. Field cases should not be overfilled, for not only is the top layer of fruit injured by the weight of the case above, but all fruits in the over-filled case are liable to suffer from this pressure. Finger nails should be kept cut short if gloves are not worn. Injury is most liable to occur while the fruit is fresh from the tree.

—A. M. W. GREIG, Citriculturist, Auckland.

Cool Storage Notes

Importance of Humidity

ATMOSPHERIC air is a mixture of a number of gases, namely, nitrogen, oxygen, carbon-dioxide, water vapour, etc.

The amount of moisture contained in a specified quantity of air is entirely contingent upon its temperature. The higher the temperature the larger the quantity of moisture the air will sustain, while at a lower temperature the amount of water the air can contain is modified. Air is only capable of absorbing a specific quantity of water before becoming fully saturated.

Relative Humidity

Relative humidity is always expressed in percentage, and whatever percentage of humidity is mentioned, it signifies that at a designated temperature the air will sustain that percentage, or as much water vapour as it would contain were it fully saturated. In other words, a humidity of 75 per cent. indicates that the air retains 75 per cent., or three-quarters, as much water vapour as it would be possible for it to retain at the saturation point.

To control the humidity of the atmosphere of a cool-storage chamber the air movement throughout the chamber should be uniformly distributed.

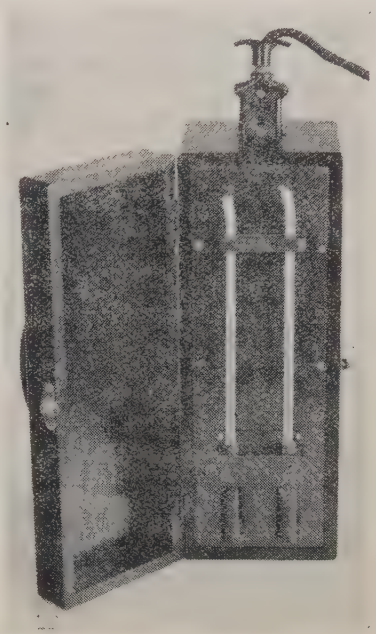
Condensation and accumulation of moisture in cool-storage chambers are natural results of varying temperatures, which are largely brought about by the following—faulty insulation of the chambers, capacity or design of the refrigerating equipment, or the air circulation system installed.

The quantity of water vapour which the air is capable of absorbing to the maximum degree of saturation, designated in grains of water per cubic foot of air at certain temperatures, is shown as follows:—

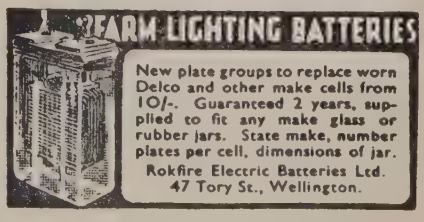
Temperature. Fahr.	Grains of water per cubic feet of air.
30°	1.94
32°	2.35
35°	2.40
40°	2.85
45°	3.44
50°	4.08
55°	4.80
60°	5.70

The long storage stocks of pears and apples in cool-storage chambers should be kept under supervision, as a regular inspection is essential to check its condition and to determine the time to place it on the market.

The illustration shows an electrically operated ventilated wet and dry bulb thermometer for testing the relative humidity of cool-storage chambers. This instrument can be relied on for accuracy, it is of strong construction, and is manufactured in New Zealand at a reasonable cost. It has recently been designed for use in fruit cool-stores by Messrs. J. L. Mandeno and S. K. Newall, Chemists at the Dominion Laboratory, Wellington.



—A. A. POWELL, Cool Storage Officer, Wellington.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Guide for the Home Garden

A Programme for June

"The nearest approach to tears that should be shed in gardening are drops of honest sweat—and these are good for us."—Julia H. Cummins.

Potatoes.—The location of the garden as well as the type of soil should be considered before purchasing potato seed. Low-lying land where the water table is high and which is unlikely to become warm early in spring cannot be recommended for early planting. Local conditions will be the principal factor in determining whether an early, main, or late maturing variety should be grown. In districts subject to late frosts, planting should be delayed till the danger period has passed. The crop, however, requires a period of from 3½ to 4½ months free from frost, according to variety, to grow to maturity.

Seed.—This may be purchased as early as convenient and placed in a shallow seedling box "eyes up"—to sprout. To set the tubers properly, raise the box at one end and begin by placing the seed first at the lower end. By this method the seed will be kept upright until the box is full. In purchasing seed, care should be taken to secure tubers of a size, suitable for planting at a particular time. For early planting, whole seed is recommended, while large tubers, which may be cut after sprouting—and just before planting—will be suitable for main and late crops.

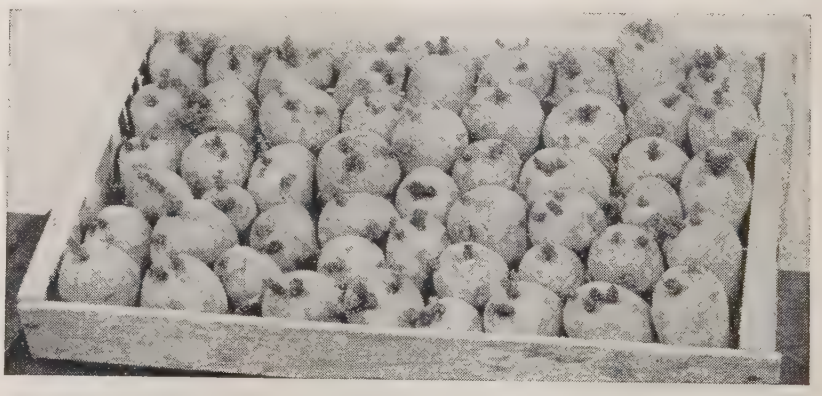
For reasons justified by the following production figures, the purchase of Government certified seed is recommended.

	Average tons per acre.
Government certified seed ..	14
Seed twice grown from certified seed	11
Seed once grown from certified seed	10
Uncertified seed	7.6

These results, from trials recently carried out at the Plant Research Station, prove how quickly good seed may deteriorate even when grown in one's own garden.

If it is intended to dig a piece of land at present which may be used next planting season for potatoes, no lime should be applied. Provided a choice is available, select a part of the garden which has been limed during the season just ended.

The accompanying photo is that of a well-sprouted box of potato seed. An early variety—"Epicure."



[*Photograph by A. L. Bryant.*

Look Out For Slugs

Spring Cabbages.—A constant lookout should be kept for slug or snail damage on this crop. Burnt lime, applied in the evening, is an effective remedy. Applications should be made at night, as at this time these pests are most active. To be properly applied, the lime should be thrown between the rows of plants with considerable force. Provided the lime has been air slaked and reduced to a fine powder most of it will rise and in doing so come in contact with the slugs, which feed principally on the underside of the leaves.

To assist development of the plants during this period, weekly applications of liquid manure or a "pinch" of Nitrate of Soda to each plant, placed as nearly as possible above its immediate rooting area, will be beneficial. Weeding should be attended to and the weeds removed from among the plants—preferably to assist later in the formation of a compost heap. During the weather which is likely to prevail in June, weed destruction by cultivation is not practicable.

Cauliflower.—In warm districts, early cauliflower plants may be set out. Care, however, should be taken that the position chosen is not unduly exposed to cold southerly weather. For maturing in December, seeds of the Early London or All the Year Round varieties may be sown in rows in a seedling box. The rows in which seed is sown at this season should be wider apart than sowings which may be made in spring or summer. In wider-spaced rows, mildew and damping off is less likely to develop among the young seedlings. The soil should be well aerated by frequent shallow working; this may be done with a dining fork.

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What To Do In The Garden Next Month

Summary of Operations During June

VEGETABLE SECTION.

SEEDLINGS TO TRANSPLANT AND PLANTS TO SET.

Except in warm districts, seedlings should not be planted out.

Shallots may be set out late this month or early July.

Potatoes.—Only in frost-free districts.

Lettuce.—Sow seed this month for early planting and late spring harvesting.

Cabbage.—Make a sowing of Enfield Market for early spring planting.

Cauliflower.—Late June sow in a seedling box and transplant in late August or early September.

PERENNIAL CROPS.

Rhubarb.—Crowns should be planted as soon as the "buds" begin to "shoot" prominently.

Asparagus.—Clean up old beds and apply a dressing of blood and bone manure—a good handful to each crown. Work this into the soil by shallow cultivation. Dig and trench part of the garden if it is intended to plant new crowns next month.

CROPS IN SEASON.

Greens.—Sow seed of Spinach—July, August. Silver Beet—August. Broad Beans—June. Cress—All seasons. Rhubarb (Winter)—Sow seeds in June.

Roots.—Artichokes (Globe) September, (Jerusalem) August. Beetroot—all seasons. Carrots—August, September, February, March. Celeriac—August, September, October. Turnips—October to March (warm districts, all seasons).

Lettuce.—Seed for early planting and late October cutting may now be sown and successive sowings made to maintain supplies of this desirable salad vegetable. Webbs Wonderful and Success are specially recommended.

Conserve Seed

Seed Sowing.—Whatever may be the position of supplies of vegetable seeds in the Dominion it should be assumed that there are none to waste. In general terms, a great amount of seed is lost annually through (1) sowing too much seed for the quantity of plants required, (2) sowings being made out of season, (3) the adoption of wrong methods of sowing, and (4) careless storage. The accompanying photograph is that of a box of lettuce seedlings grown from the contents of a sixpenny packet of seed purchased two years before it was used. From this box 246 lettuce plants were set out. Lettuce seed may be sown broadcast or in rows. The latter method is preferable for late autumn and winter sowings.

Sowings made out of season—particularly when this is done in an outside bed—and before the soil has become sufficiently warm to ensure good germination, causes the loss of considerable quantities of seed. To sow seeds of spring cabbage in August or September is not good practice. Seeds of this vegetable, if sown at the proper time and the plants set out when ready, should be fit for harvesting during September.

Sowing seeds too deep or too shallow, according to the season, is, in the first instance, often responsible for poor germination and pre-emergence damping-off. In the second instance there may not be sufficient soil cover to permit the retention of moisture necessary for seed germination.

Keep seed in the original packets, clearly marked with the date of purchase. Put them in a tin container with a lid on it and keep in a cool, dry place. This will materially contribute towards maintaining their useful life. In addition to what has already appeared in a previous issue of the Journal with regard to the longevity of seed, the following figures

[*Photograph by A. L. Bryant.*

Seasonal Don'ts

Don't

just think about digging the garden—dig it.

Don't

neglect to sow a green cover crop on any vacant garden plot which is likely to remain unplanted for any considerable time.

Don't

permit gardening tools to remain dirty and rusty. Keep the steel parts bright; this will lessen labour when they are being used.

Don't

put the remains of diseased vegetable crops on the compost heap. Unless sterilisation is practised, spreading the compost on the garden will also spread disease for following crops.

When In Trouble

When results from growing your own seeds and growing your own plants are unsatisfactory and you are worrying over the probable cause, why not consign your troubles to the Director of the Horticulture Division, P.O. Box 3004, Wellington? He may be able to assist you. Write him now.

indicate the results of trial which were made by officers of the Department of Agriculture, N.S.W., Australia.

	Percentage of Germination. Years.		
	1.	2.	3.
Broad Beans	98	99	97
French Beans (Burpees Stringless)	96	90	91
Beans (Canadian Wonder)	100	96	96
Beet (Red)	70	45	39
Cabbage (Springtide)	94	82	64
Cabbage (Enfield Market)	76	32	22
Carrot	54	52	51
Cauliflower	75	56	42
Cucumber	98	51	48
Lettuce	97	96	68
Parsley	92	62	57
Parsnip	77	30	9
Peas (Greenfeast)	97	94	98
Pumpkin (Ironbark)	74	59	56
Radish	97	82	89
Rock Melon	100	100	100
Tomato	98	97	97
Turnip (Model White)	96	88	82

The lesson to be learned from these results is that, properly cared-for, seeds which may be unused during the season in which they were purchased need not be discarded or destroyed, but may be carried over and subsequently sown. Should there be any doubt the following season concerning the productive value of the seed, a simple germination test may be made before sowing. Place 25 seeds between two layers of damp blotting paper or clean, soft, white cloth. Lay on a small, shallow plate or saucer and keep in a reasonably warm position. While a low temperature must be prevented, it is important in a test such as this to ensure that the material in which the seed has been placed never becomes dry. Sufficient slightly warm water should, at regular intervals, be put into the bottom of the container to keep the paper or cloth moist, but not wet. From five to ten days—for most varieties—will be necessary to prove the percentage of germination of the seed being tested.

Use and Value of Lime

Lime fulfils such a number of functions in the soil, and is of such vital importance that it may be rightly regarded as the chief factor in the maintenance of soil fertility. The term "lime" in the agricultural sense—which embraces the culture of vegetables—includes the various calcium and magnesium bearing materials which are applied to improve the condition of acid soils. On heavy clay soils it brings about a condition which permits better drainage, induces earlier warming of the soil in spring, makes the soil more friable, and, in dry seasons, tends to prevent it from baking and cracking. This results in a longer growing period for crops, with consequent greater and better production.

On light soils, lime acts as a cohesive agent and makes them more retentive of moisture. Chemically, carbonate of lime maintains the neutral reaction necessary to develop the bacteria which assist in breaking up the organic matter of the soil. Where green manuring is being practised in the garden, or composts are being used, lime must be provided in order that the bacteria may be assisted in the work of transforming the organic soil content into necessary plant nutrient.

To maintain the soil in an essentially "sweet"—non-acid—condition, the calcium content should be adequately maintained, and this is best accomplished by annual applications of carbonate of lime, generally termed "agricultural" lime. Where a crop of cabbages or plants belonging to this family have been grown, a light dressing of lime before digging the part of the garden which the crop had occupied is recommended, and before planting the succeeding crop a heavier dressing should be given. For applications as recommended above, these should be at the rate of 1 oz. and 2 oz. respectively per square yard. In addition, crop rotation should be practised.

If burnt or hydrated lime is available, it will, if applied in smaller quantities, serve a useful purpose, but it will be much more expensive. Provided lime is used as suggested, one outstanding benefit to the soil will be to prevent—as far as practicable—the development in the soil of the fungus—*Plasmodiaphora brassicae*—responsible for club root on cabbages, cauliflowers, swede turnips, etc.

Vegetables which are substantially benefited through adding lime to the soil are:—Asparagus, beets, cabbages, celery, leeks, lettuce, onions, peas, parsnips, and spinach. Other vegetables benefit to a more or less degree.

When lime is being applied to the soil, the following old rhyme should be borne in mind, "Lime and lime without manure, makes both farm and farmer poor." Lime, therefore, when being applied to the soil, should not be considered as a fertiliser, but as necessary—briefly—for the maintenance of soil fertility.

—D. K. PRITCHARD, Instructor in Vegetable Culture, Wellington.

SUBSCRIPTION RATES.

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Seasonal Work for Beekeepers

Save Every Scrap of Wax

THE principal sources of commercial beeswax in New Zealand today are old bee combs which are unsuitable for further use in commercial apiaries and the cappings from storage combs when the crop of honey is being extracted, consequently there is at present a shortage of this commodity.

While the beekeeper uses a great amount of beeswax in furnishing the comb foundations for his bees, there are also many commercial uses for beeswax, the most important of which at present is the manufacture of war materials, including insulating compounds and special lubricants.

Owing to the very poor honey season just closed, and the scarcity of beeswax in New Zealand at present, beekeepers will render an important national service if every scrap of wax not in use in their apiaries is collected and made available in bulk for manufacturing purposes.

From 2½ to 3 lb. of wax are usually obtainable from a set of ten combs when proper methods of extraction are used, and approximately 30 lb. of first-quality wax may be obtained from the cappings of every ton of honey extracted, according to the depth of cappings taken. Where this amount is not obtained the local Apiary Instructor should be consulted with a view to improving the methods employed and thus securing maximum of production.

Important points to be observed are:—

Melting combs in water is the simplest way to secure the maximum amount of wax from them, provided a suitable press is used.

Only rain water should be used for this work; but where it is not available a little vinegar added to the water will help.

Old combs should be placed in a copper of hot water and gently boiled until all wax is set free before the press is brought into use.

The secret in pressing is to deal with small lots and keeping the liquid as hot as possible during operations.

The hotter the wax when run into moulds the cleaner will it set right to the bottom of each block.

Slow cooling is desirable to prevent the blocks from cracking.

—T. S. WINTER, Senior Apiary Instructor.

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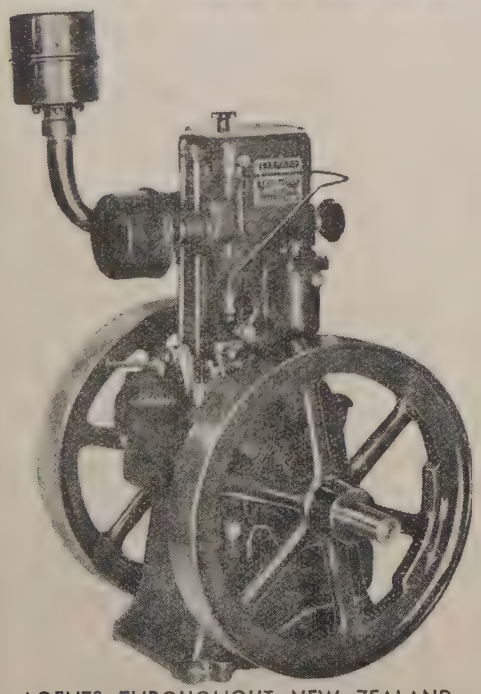

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AGENTS THROUGHOUT NEW ZEALAND.

Theory and Practice of Feeding

PART III.

By F. C. BOBBY,
Superintendent of Poultry Husbandry,
Wellington.

A NUMBER of the more important scientific theories governing poultry feeding have been discussed in Parts I and II, previously published in this Journal. The stage has now been reached when this theoretical information must be blended in with practice. The two combined—science with practice—give a depth of knowledge which will stand by a poultry keeper in all normal circumstances. The well-informed poultry keeper can make changes in feeding, if felt desirable or when circumstances dictate, with confidence and not along hit or miss and experimental lines.

When the practical aspects of feeding poultry come under review there are two main lines for discussion, namely, how to feed and what to feed. Although they are obviously interdependent and it makes little difference which is taken first, a discussion of systems of feeding will receive first consideration.

Thirty-five to forty years ago those interested in poultry keeping for egg production fed their birds with a particular grain such as wheat, while reports show that experiments were carried out in England about 1906 with a view to ascertaining the best mixture of grains for poultry. Since that time many systems of feeding have been advocated and adopted by poultry keepers according to their particular circumstances and the measure of success obtained with any given system. Among the systems of feeding tried may be mentioned:—

(a) Moist mash and grain.
(b) Dry mash and grain.
(c) All dry mash.
(d) Pellets (of mash) and grain.
(e) Soaked grain feeding.

The above-named systems may be used for chick or adult stock feeding, with the exception of (e), since whole grain soaked cannot be fed to young birds until after 10 weeks of age. In addition various combinations of these feeding systems have proved satisfactory.

Management

It will be appreciated that these systems or combinations of these systems vary in efficiency according to the method of management of the birds concerned, and also according to the age of the birds. For instance, the semi-intensive as against the intensive system of running birds may be cited, while a system admirably suitable for laying pullets might be disastrous with breeding hens.

The point will be made clearer when each system of feeding is discussed. No attempt will be made to say that any particular system is the best for feeding poultry, since all have been used successfully by individual poultry keepers. The apparent merits and disadvantages of each system will be noted, taking into consideration certain varying circumstances already referred to above. Furthermore, since this review of poultry feeding must be limited to some extent it is only intended that three systems (and combinations of these systems) shall be described, these being the systems commonly in use in New Zealand. A description of these systems must be divided under two main headings.

(a) Feeding laying or adult stock.
(b) Feeding young chicks and growing stock.

A. ADULT STOCK

In practice the majority of poultry keepers give their birds a laying mash and grain. It is also common practice to give birds equal parts by weight of these two main component parts of the ration. This satisfies both the known practical and theoretical requirements of a laying bird, although in certain circumstances, such as for birds in laying cages, only mash need be fed. There are, however, two good reasons for feeding both mash and grain. The feeding of grain aids considerably in keeping up a satisfactory body weight and condition—a form of maintenance ration; while mash with its heavier protein content may be said to be a production ration.

There is in addition a second reason which is connected with the health of the bird's digestive system. If only soft, finely-ground-up food is fed to poultry there is a tendency for the powerful gizzard muscles to become soft and flabby. This is the result of the reduction of grinding work required of this particular organ. When this occurs an increase in digestive troubles may be expected with an accompanying loss in "tone" or "health" of the remainder of the digestive tract (intestines). This statement is supported in practice by observations made during post-mortem work with birds of all ages.

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It is also necessary to stress the importance of feeding adequate amounts of green food, metal grit, and oyster shell (or its equivalent) irrespective of the system of feeding employed.

There are always necessary adjuncts. A further word of importance concerns the fact that feeding poultry. If the best results are to be achieved, is not a purely mechanical job **personal attention to detail is of the utmost importance.** These details include adequate interest in bought stock, examination of the food offered, as to the presence of metal grit, and the attention paid to regular feeding times.

(a) Moist Mash and Grain:

This system usually consists of feeding a mash meal in the early morning, a grain feed midday, and another grain feed in the late afternoon. Variations of this system may include two wet mashes daily—one early morning and the second in the late afternoon—with a grain feed at midday.

As a guide when feeding it may be assumed that a laying bird will consume about 4 oz. of food daily, and it has already been shown that this should be half mash and half grain or 2 oz. mash and 2 oz. grain. On an average the heavier the rate of egg production the greater the quantity of food required, and vice versa. In practice the number of birds in a pen or flock may be divided by eight and the figure obtained represents the total weight of food—either grain or mash weighed dry—required by those birds on a basis of 2 oz. per bird. Such calculations should only be used as a guide, however, since the art of feeding is knowing just what birds are requiring at any given time.

Wet mash, for instance, is fed in wooden V-troughs and the amount given should be readily eaten up within 20-30 minutes. Should any be left after this period of time it is safe to say that the birds have been overfed and less should be given at the next meal. Again, when grain is fed in the litter this should be cleaned right up and it should not be possible to find an appreciable quantity in the litter an hour or two after feeding. Birds should always show a keen interest in their food at feeding times—if they do not, then it is likely that the feeding is wrong or the birds themselves are ailing.

A further small variation in feeding under this system and one not common in the Dominion is offered for consideration. This entails feeding a small grain feed in early morning at the rate of approximately ½ oz. per bird, a full wet mash feed about 10 o'clock at the rate of 2 ozs. per bird, and a second grain feed in the late afternoon, giving the remaining 1½ ozs. per bird.

This is particularly suitable for birds running on grass runs. Such birds become the most early feed of grain, and since this feed does not actively satisfy them they immediately range and take more notice in search of further food. In this way the birds are encouraged to get out of their houses and make full use of their runs. Later in the morning the mash satisfies their appetite and is very readily eaten.

As it is now the time of day when egg laying is at its height and when it may be and outside in the run, if the birds remain in their house for a rest no harm is done. The first grain feed sets up the right conditions for the night but the natural desire to range towards evening usually takes the birds out of the house again. This is the method of feeding practised by the vast majority of poultry keepers in England when using the wet mash and grain system.

Under present conditions when labour is scarce it is interesting to note that the wet mash feed may be left out entirely for one day a week, as for instance on Sundays. A slightly increased grain feed should be given morning and evening. Practice has proved that this is in no way detrimental to the stock and will not decrease egg production always providing the birds are not suddenly changed over to this method of Sunday feeding in the middle of winter when changes are most undesirable.

Wet mash feeding has the great advantage of being a method of feeding which is completely controlled. The birds receive amounts of mash and grain according to their appetite, while definite periods of rest from feeding between meals are given. The person responsible for feeding has a full opportunity for observing the birds at feeding time, noting whether their appetites are keen or whether any birds are ailing and in consequence fail to come up for their mash or grain.

Wet mash and grain is a system of feeding well suited to good "workmen" handling any class of adult poultry. In addition wet mash affords an excellent medium in which dropped grains may be fed, thereby ensuring that all birds receive an adequate quantity of this essential.

The disadvantages of this system are limited. It is claimed that the labour involved in feeding wet mash is greater than that required by the dry mash and grain system, and in consequence the latter mentioned system is often favoured by large commercial egg farmers. Furthermore it must be realised that with wet mash and grain feeding the flock is dependent to a great extent upon the skill of the feeder, whereas in dry mash feeding the system is more "foolproof" against under feeding.

The length of trough space can also seriously affect the efficiency of this system. Obviously if insufficient space is allowed only the strongest and most active birds will reach the trough when first filled, while shy or smaller birds will always tend to be underfed. The space required by 100 adult birds when fed with wet mash in V-troughs should not be less than 30 feet of trough space.

(b) Dry Mash and Grain:

This system differs from the last in that the mash is placed before the birds in a dry form in hoppers. These hoppers may be open at all times for the birds to feed at will throughout the day or may be shut down for

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limited periods during the day, thereby exercising some control over the feeding.

Grain is usually fed in two feeds; given in the early morning and late afternoon. This is a comparatively simple system of feeding but certain facts must be kept in view. The birds are unable to eat a full ration of mash (2 ozs.) at one visit to the hopper and are therefore using this hopper at intervals throughout the day. If the hopper space is too limited or should the mash fail to fall down from the container and not be available to the birds, then underfeeding will result. To ensure that this is not the case 20 feet of single-sided hopper or 10 feet of double-sided hopper should be allowed per 100 adult birds, while regular daily visits to the hopper must be made to ensure that an adequate supply of mash is pushed down into the feeding trough at the base of the hopper container.

These last remarks particularly apply when the hoppers are closed for limited periods during the day and the feeding time is in consequence reduced. Lack of feeding space will then become a serious factor adversely affecting anticipated satisfactory results.

Dry mash feeding effects a saving in labour since the hoppers need only be filled up once or twice weekly according to their capacity. Providing sufficient feeding space is provided, all birds have a satisfactory opportunity of obtaining ample mash during the day, while the birds can be left for considerable periods daily without fear of harm as far as feeding is concerned.

Against these advantages must be set the fact that no accurate idea can be formed as to birds' appetites and the amount of grain fed can easily get out of proportion to the amount of mash the birds elect to eat. Since the birds are compelled to visit the hoppers frequently there is a tendency for this system to encourage birds to remain in their houses and not to range over their grass runs. Furthermore, only the best types of dry mash hoppers reduce waste to a minimum, while in many cases appreciable quantities of mash are hooked out of the hoppers and wasted. This system of feeding should be restricted to laying pullets. If applied to hens used as breeders, troubles occur only too often as the result of over fatness—particularly with heavy-breed hens.

Where controlled dry mash feeding is practised it is suggested that the hoppers be closed down at midday and be left closed until after the late afternoon grain feed. By this means the birds are kept from food for some 4 hours, rest their digestive systems, and develop a proper appetite for the evening grain feed.

Wet and Dry Mash Combined:

A number of poultry keepers use a combination of the two systems and this method of feeding has definite advantages during the late autumn and winter periods, when it is desirable to keep up egg production and body condition. During the shorter hours of daylight it is an aid to encouraging higher food consumption which can so vitally affect egg production and help to ward off neck moulting.

In a large number of cases the first heavy flush of eggs laid by a pullet results in a loss of body weight and, put quite simply, the output of eggs is in excess of the intake of food. This leads to the bird drawing on body reserves; resulting in a loss of body condition which is so often followed by a partial moult.

When combining the two systems care must be taken to avoid spoiling the birds' appetites by sickening them of their food. It is also possible to defeat the purpose of the combined system by feeding an additional wet mash to birds normally dry-mash fed, with the only result that the birds eat less dry mash. The total of mash consumed is the same and no advantage has been gained.

Thus, for those poultry keepers using the dry mash system, it is suggested that the hoppers be closed down as usual at midday and a small wet mash fed at that time. This wet mash will be eaten up quickly and is then in addition to the dry mash already consumed. A rest from food follows and the birds are now given an appetite for their evening grain feed.

The poultry keeper who uses the wet mash and grain system is advised to provide dry mash hoppers also, allowing about 10 feet single side feeding space or 5 feet double side feeding space for 100 birds. These hoppers should only be opened after the birds have received their wet mash and must be closed down again an hour or two before the evening grain feed. In this way any dry mash eaten will be in addition to the wet mash and by closing the hoppers down again the birds' appetites for their evening grain will not be spoilt.

The whole object of combining the systems is to get increased food consumption without giving the birds a surfeit of food and thereby killing their normal keen appetites.

(To be continued.)

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Federation of Young Farmers' Clubs

Meeting of Dominion Executive Committee

A MEETING of the Dominion Executive Committee was held in Wellington on March 27th last. The Dominion President, Mr. D. S. Ross, of Te Puke, presided over a very representative gathering, delegates being present from the Otago-Southland, Canterbury, Wellington, and Auckland Councils, together with representatives of the N.Z. Farmers' Union, the Department of Agriculture, and Massey College.

The main business of the meeting dealt with the policy of the Federation in view of the War situation. A report submitted by the Organising Secretary revealed that, out of over 200 clubs in existence before the War, only about 80 are still in a position to actively function; the remainder have either gone into recess for the period of the War, or will be forced to do so at an early date. Over 2,000 active members are now serving with the armed forces; this depletion of membership has hit some clubs particularly hard, added to which the petrol shortage has increased the difficulties, making it harder to hold meetings, especially in scattered districts. While in some localities the horse and the bicycle are again coming into their own as a means of transport to meetings, it is a fact that clubs able to carry on are mainly in that position owing to a considerable proportion of their membership being under the age of 18 years.

Recognising the value of the movement in both peace and war time, and having regard to the potentialities of the organisation so far as post-war activity is concerned, the meeting decided that every effort should be made to hold the movement together. The following resolution was carried: "That this Dominion Executive Committee, recognising the present difficulties of clubs, and those which are likely to arise, believes that although there must be a very definite curtailment of activities, every effort should be made to continue the organisation in a modified form. To this end it is suggested (a) that club activities should be carried on within the limits imposed by their relying on their own resources, and that, wherever possible, clubs be encouraged to carry on; (b) that Councils should continue in office, constituted as in their own opinion is desirable; (c) that the Dominion Executive Committee should set up a small advisory committee to keep the movement intact until such time as full activities can be resumed."

The remainder of the meeting was occupied with remits and matters of routine. It was reported that the annual grant of £500 had been received from the Government, and it was decided to allocate sums of £100 each to the four Councils as has been the procedure in the past.

A remit from the Auckland Council, dealing with a proposal to inaugurate a Y.F.C. Memorial Fund, occasioned considerable interest and discussion. The remit was as follows: "That a fund be established by the Federation in memory of members of the Y.F.C. who have lost their lives whilst serving in his Majesty's Forces overseas, and that the money so collected be used to educate sons of deceased members of the Mercantile Marine to officer rank in the Merchant Service." The remit was eventually put to the meeting in two parts, the first part, relating to the establishing of the fund, being carried for consideration at the Annual General Meeting of the Federation. The second part, dealing with the application of the fund, was defeated by a Canterbury Council remit brought forward as an amendment, as follows: "That the proposals should apply to a wider range of possible recipients to whom, as a country, we owe a debt, than is suggested by the Auckland remit, and that a part of the facilities offered to recipients should be allied to the educational aims of the Y.F.C. movement; and that any suggestion of raising money as a memorial to Y.F.C. members killed overseas be referred to Councils, District Committees, and Clubs for consideration." It was arranged for Clubs to be circularised, with a request that they forward suggestions and recommendations to the Annual General Meeting.

The following remits were also carried:—Auckland Council: "That any club wishing to go into recess must make formal application to its district committee to do so." (It was considered that such a course would direct the attention of district committees to any weaknesses in clubs and permit of assistance being rendered if possible, and would also aid in carrying out the Federation's desire that the books and funds of clubs in recess should be held in trust by their district committee.) Auckland Council: "That a Dominion-wide appeal be made to Y.F.C. members and members of clubs in recess to wear the club badge, this being a valuable means of keeping alive a keen interest in the movement in the face of present difficulties." Otago-Southland Council: "That the Dominion President be asked to prepare a personal appeal to every member of the Y.F.C. organisation in New Zealand." This was readily agreed to by the President. Otago-Southland: "That the Dominion Executive Committee be urged to back up the appeal of the Director of Primary Production for the increased production of wheat, oats, potatoes and linen flax, and that means be explored whereby all units of the Y.F.C. organisation can assist in achieving this object." It was decided that an appeal along these lines be circulated. Otago-Southland Council: "That even where clubs are in recess, arrangements should be made with those concerned to extend invitations to representatives of the Y.F.C. where mass meetings are being held by Primary Production Councils and Committees." It was agreed that this be brought to the notice of the National Council of Primary Production. Canterbury Council: "That a small leaflet be prepared setting out the aims and activities of the Y.F.C. movement, for distribution to schools, and that Education Boards be approached to invite their Instructors to distribute same." The Secretary stated that a pamphlet prepared by him in July, 1938, could be abridged and brought up to date.

Under the heading of General Business, the following motions were carried: "That District Committees and Councils be asked to submit reports of their meetings for publication in the Y.F.C. section of the Journal of Agriculture." and "That the recommendations of the sub-committee set up to deal with Women's Auxiliaries, be referred back to that committee for further consideration, the Secretary to draw attention to the requirements as made manifest at the Annual General Meeting in July last."

It was decided that the Eighth Annual General Meeting of the Federation be held as near to Wednesday, July 1, as is convenient, the arranging of the exact date to be left to the Chairman and Secretary; the Annual General Meeting is to be held this year at Dunedin.

The Chairman thanked the delegates for atttending the meeting, and expressed his hopes for a very successful Annual General Meeting at Dunedin. The meeting closed with a vote of thanks to the chair.

Te Karaka Y.F.C. Sixth Annual Report

By W. J. PEVREAL, Hon. Secretary, Te Karaka Y.F.C.

The following report, one of many received, is published in these pages because it is a typical annual report, and also because it contains a message of encouragement to other clubs. The report was submitted by W. J. Pevreal, club chairman, at the sixth annual meeting of the Te Karaka Y.F.C., Poverty Bay. Incidentally Mr. Pevreal is one of the "under eighteens" who have assumed the responsibilities of members serving overseas; he is doing a good job of work as club chairman in holding the club together.

THE past year has seen our membership depleted as the trumpet has sounded the call to arms, and our club is well represented in the fighting services. We endeavour to keep in contact with our members in the forces, and wherever possible the N.Z. Journal of Agriculture is posted to them. Those serving overseas are J. Dymock, D. Dymock, R. Bright, E. Newton, and A. Bayley, of whom E. Newton is a prisoner of war in Germany; and we regret to say that R. Bright, who was a keen member and an able chairman, has paid the supreme sacrifice. M. Campbell, J. McKenzie, H. McLeod, A. and D. Nesshausen, A. Manuel, H. Robertson, and R. Stevenson are in Territorial camp. To all these members we send best wishes and good luck, especially to those overseas.

In our endeavours to maintain our club we held a very active recruiting drive for junior members, the result of which has been very encouraging. To those new members enrolled during the year, we trust that you have found the club a source of education and enjoyment, and we express the hope that we may have your friendship and company in the coming years. We wish luck to the branch club now being formed in the Te Karaka District High School, and assure it our whole-hearted co-operation and assistance.

It was a blow to the club when Mr. E. M. Bates, our district secretary, joined the Air Force last May. We have missed him keenly, his assistance over the past years having sustained us when the outlook was dark. We express our sincere thanks for all he has done and wish him good fortune in his new career.

The death of Mr. W. C. Bull in January last was an irreparable loss. As our advisory president for a number of years he was our close confidant and friend. He had a genuine interest in the club, always obliging when called upon, and unstinting in kindly advice. Our profound sorrow and sympathy go out to his bereaved family.

Looking back, the past twelve months have been of great interest, and despite our isolation, petrol restrictions, and other retarding factors, the club has been singularly fortunate in having had seven lectures, all intensely interesting. The year opened with a talk by Mr. Bree on "Insurance," followed by Mr. Bould, "Stock Diseases"; Mr. Alexander, "Parasites" and "Horses and Their Common Ailments"; Mr. Knowlton, "Genetics"; Mr. Whitham, "Herd Improvement and Breeding"; Mr. Picken, "Fat Lamb Production"; and Mr. Ojala, "Artificial Manures." We cannot over-emphasise the fact that it is the willingness of these men to address us that stimulates the club and keeps it functioning. To these gentlemen we can only say a very sincere "Thank you." The remaining meetings were occupied by individual talks from members, competing for Mr. Bull's trophy. Mr. Bull kindly sponsored a similar competition to last year's, the winner being the most improved speaker of the year. It had been intended to hold at least three competitions for this trophy, but due to the unavoidable absence of members, only one was held, and now, since the death of Mr. Bull, the competition has been closed. Our September and December meetings were held as social evenings, the latter being worthy of note as being one of the largest attendances of the year. Due to the suddenness of the Territorial call-up, there was no meeting held in January.

The appointment of Mr. E. M. Ojala as district secretary was warmly welcomed by all members, and during his brief period of office he accomplished much to stimulate our activities. Before the fruits of his efforts could, however, be gathered, he was called to a task of major importance, and we were again robbed of an inspiring leader.

Regular radio talks from Station 2ZM Gisborne are being delivered, their quality and perfection being a credit to concerned in their production. An essay competition, for junior and senior members, on some topic of farming interest, with a view to being broadcast in radio talks, at present awaits judgment. Much of the groundwork for our manure and strains trials has been completed, and as soon as the necessary supplies become available, the experiments will be proceeded with. To all farmers who are co-operating with us and allowing plots to be laid down on their farms, we express our thanks.

The club wishes to record its sincere appreciation and gratitude to our patron, Mr. Heeney, to whose generosity we are indebted for the use of his committee room, where we have spent many pleasant evenings. To Mr. W. Duncan, our advisory president, we would also offer our thanks; although severely handicapped by pressing farm duties, he has been most helpful to the club, and is a worthy successor to the late Mr. Bull.

This report would not be complete without mention of Mr. Knowlton and Mr. Moverley; both gentlemen have shown keen interest in the club, which we very sincerely appreciate. We thank Mr. Knowlton for judging our Improved Speakers competition, and Mr. Moverley for arousing the interest of the High School Rural Class boys in the Y.F.C. movement, and we hope to still further develop our happy friendship.

In conclusion, the secretary, the treasurer, and I would like to thank all members who have supported the club through this difficult year; their keenness has made our task very much easier and enjoyable. As a club which has felt, and so far withstood, the stresses imposed by the war, we would send to all our brother clubs that may be crumbling under the strain a message of good will; may their hard toil be crowned with success in maintaining the finest youth organisation in New Zealand.

Reports on Club Activities

EASTERN SOUTHLAND.

Five Rivers.—Short talks by Club members.

SOUTH OTAGO.

Warepa.—Arrangements for Memorial tree and plaque in respect of a former club member. Lecture by Mr. G. Maye, sen., of Kakapuaka, on "The Care, Handling, and Training of a Sheep Dog, Suitable to the Ordinary Sheep Farmer." At the previous meeting, Mr. Howard Pannett, of Ashley Downs, gave a demonstration on Southdown rams, kindly supplied by Mr. W. Benson, of Warepa. The speaker outlined the history of the breed and then detailed the special characteristics to be sought in a good Southdown ram.

DUNEDIN.

West Taieri.—Annual meeting. Officers elected: Advisory president, Mr. F. D. Reid; chairman, W. A. Young; vice-chairman, R. Reid; secretary and treasurer, L. Doherty. A discussion as to whether the club should carry on in the face of depleted membership and other handicaps revealed that a small proportion of keen members were able and anxious to attend meetings. It was decided to carry on.

MID-CANTERBURY.

Ashburton.—Annual meeting. Officers elected: Patron, Lieutenant C. C. Werry; chairman, E. McClelland; secretary, S. Watson; treasurer, K. Latimer; advisory members, Messrs. H. G. N. Watson, L. L. Aitken, and W. H. Vaughan. Twenty-one members attended.

Hinds.—Annual meeting. Officers elected: Advisory president, Mr. H. L. Chisnall; chairman, D. Chisnall; vice-chairman, W. Heeley; secretary, C. Davison; treasurer, R. Watson. A farewell was tendered to Leading Aircraftman L. Watson, who has been an active member of the club for a number of years. E. Rhodes spoke on behalf of fellow-members.

CHRISTCHURCH.

Darfield.—Annual meeting. Officers elected: Advisory presidents, Messrs. R. S. Gunn and C. O. Redfern; chairman, L. McLaughlin; vice-chairman, A. McLaughlin; secretary, C. Stott; assistant secretary, G. Eaves. Eighteen members were present.

Ellesmere.—Annual meeting. Officers elected: Advisory president, Mr. G. W. R. Osborne; chairman, D. Hurford; secretary, W. T. Abbott; assistant secretary, L. A. McLachlan. There was an attendance of 19 members.

HOROWHENUA.

Levin.—Annual meeting. Officers elected: Advisory president, Mr. H. J. Lancaster; chairman, R. M. Law; vice-chairman, J. O. Stewart; secretary and treasurer, R. Speedy; advisory members, Messrs. R. A. MacDonald, G. S. Robinson, and C. E. C. Webb. The Dominion secretary, Mr. S. Freeman, was present and took part in discussions regarding the future of the club. There was an attendance of 29 at the meeting.

WAIRARAPA.

Masterton.—Election of eight new members. Arrangements for stock-judging competition. Interesting films exhibited by Mr. W. H. Saunders. Twenty-seven members present. Officers elected at annual meeting; Advisory president, Mr. N. Blatchford; chairman, W. Cooper; secretary, N. D. Buick; assistant secretary, R. D. Cheetham; treasurer, D. McLachlan.

MANAWATU.

Bunnythorpe.—Annual meeting. Officers elected: Advisory president, Mr. J. Linklater; chairman, C. S. Anderson; secretary and treasurer, A. J. Slack. Fourteen members present.

Feilding.—Annual meeting. Officers elected: Advisory president, Mr. H. Brewster; chairman, E. Beazer; secretary and treasurer, G. Milligan. Twelve members attended, and it was decided to carry on. Ways and means of obtaining new members were discussed. Winners of classes in the stock-judging held at Y.F.C. Stock Show were presented with certificates.

Rongotea.—Business meeting. Arrangements for future activities. Fifteen members present.

WANGANUI.

Bulls.—Annual meeting. Officers elected: Advisory president, Mr. A. D. Young; chairman, F. J. Thorley; secretary and treasurer, C. B. Anderson. Fifteen members attended.

Mangaweka.—Annual meeting. Officers elected: Advisory president, Mr. G. Bramley; chairman, M. Gardner; secretary, N. D. Weston; treasurer, C. Dickson. Ten members present.

TE KUITI.

Paewhenua.—Annual meeting. Officers elected: Advisory president, Mr. P. D. Crowley; chairman, W. Dean; vice-chairman, C. Dean; secretary, C. E. Heena; treasurer, W. N. Oakden. Two new members were enrolled.

WESTERN BAY OF PLENTY.

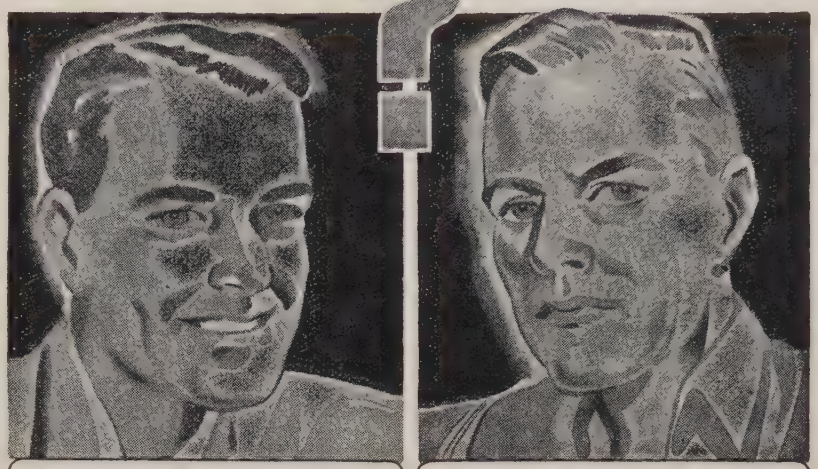
Kati Kati.—Annual meeting. Officers elected: Chairman, G. T. Walford; secretary, D. M. Clague; treasurer, A. E. Clague.

Pukehina.—Annual meeting. Officers elected: Advisory president, Mr. S. E. Winters; chairman, E. Gibbons; secretary, K. A. Shearer.

EASTERN BAY OF PLENTY.

Waimana.—Annual meeting. Officers elected: Advisory president, Mr. N. Macdonald; chairman, D. White; secretary, T. A. Doran; treasurer, J. Cain; club reporter, D. Cain.

WHICH COURSE WILL YOU TAKE



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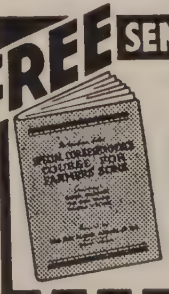

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Health Notes for the Farm

Heart Disease Is Not Always As Bad As It Sounds

Contributed by the
HEALTH DEPARTMENT

SO you've got a touch of "heart," have you? That's the reason, then, for those slight spasms of pain over the heart, those brief spells of dizziness, that shortness of breath. That's not too good, is it?

But don't let yourself get into a panic over it. It may not be so good, but after all you are getting on a little, and you have to expect a thing like that. The majority of people over 35 are walking round with some sort of heart trouble. Many of them probably don't know it. You do. You had the good sense to go to a doctor immediately you became suspicious. And now, knowing what the trouble is, you are in a position to correct it before it goes too far.

That is the trouble with most people. They let things go too far. It is one of the biggest difficulties doctors have to fight. Regular medical examinations after 35 are the best life insurance in the world.

So long as it continues to pump away steadily and do its job efficiently, that hard-working ten ounces of muscle we call the heart is rarely given a second thought. But when it starts to misfire that's a different story. We rush off to the doctor and complain about pains in the chest, and shortness of breath, and so on, that we can't account for, and we are quietly told that we have angina pectoris, or high blood pressure, or one of several cardiac deficiencies. And we wonder why.

Sensible Living

A shrewd old doctor once said that a man at forty is either his own physician or a fool. In other words, at that age, when the body starts to feel the strain of living, a man should know something about his physical shortcomings. He should know the limit of his endurance, and he should have a pretty fair idea of his physical weaknesses, and be able to adjust his daily routine to what he knows to be his own capabilities.

That's sensible living. The whole trouble with most of us is that we take too much for granted, and the result is that almost before we know it, we have cracked up. In most cases the crack-up is the result of an overloaded heart, and it occurs most frequently between the ages of 35 and 60—the period which is the most valuable and productive in anyone's life.

Everyone will agree that an ounce of prevention is worth a pound of cure, but how many fail to act in accordance with this belief? It is particularly applicable in the case of heart attacks. Many persons imagine that heart attacks come suddenly out of a clear sky. They don't realise that Nature sets her danger signals along the path of life. If these signals are heeded, the individual continues serenely on his way; if they are disregarded, there ultimately comes the crack-up—frequently the final crack-up.

There are many forms of heart disease, but the symptoms, or, in other words, Nature's danger signals, are all much alike. The most important symptoms are shortness of breath, inability to lie flat, pain in the heart region, palpitation, and swelling of the feet.

Of course, any or all of these may be associated with a purely nervous disorder of the heart. Many people with normal hearts make invalids of themselves by assuming that one or more of these symptoms indicate the existence of a grave cardiac lesion. But only a doctor can tell the true symptoms of cardiac disease from the false. Rely on his diagnosis, not on your own suspicions or fears.

High Blood Pressure

One of the most common disorders of circulation which affects those in middle life is high blood pressure. The first abnormal elevation of blood pressure is discovered usually in the late thirties or the early forties. The earliest symptoms may be hot flushes, headaches, dizziness, palpitation, and nervousness.

There is, however, no need for undue apprehension if elevation of the blood pressure is discovered. For years no organic disease is demonstrable. It is the nervous regulation of the circulation which is at fault, and emotional disturbances play an important part in controlling blood pressure. If, for instance, you happen to be worried and under a great strain, your blood pressure will be high; if you are relaxed and at ease, it will be normal. It is only when the heart begins to labour under the strain of the high blood pressure that symptoms of heart failure, such as shortness of breath, palpitation, and swelling of the feet may appear. In these cases, as in rheumatic fever, it is physical overexertion that often hastens the unfavourable outcome.

See Your Doctor

If you are the slightest bit uncertain about your heart, talk it over with your doctor. His advice may mean extra years of useful life to you.

Few people realise the wonderful service they can get from an impaired heart by using it discreetly. The heart is a remarkably adaptable organ, and many of those with heart disease can, and do, lead useful and productive lives, with very little restriction of their normal activities, by following their doctor's advice.

There is one cardinal rule for those who are in the forties and over. That is, moderation in everything. Don't forget, with plenty of rest and sensible exercise, the old heart will tick over sturdily for years. And keep your weight down.

The Poisons Act

RECENTLY issued regulations under the Poisons Act place ergot and paraldehyde on the list of poisons which can be sold only pursuant to prescription.

The regulations also give veterinary surgeons the right to prescribe the sulphonamide group of drugs. The drugs of this group can be sold wholesale only to registered medical practitioners, registered dental surgeons, registered veterinary surgeons, and registered pharmaceutical chemists, and their sale by retail is forbidden except pursuant to prescription signed by the classes of persons enumerated above, except pharmaceutical chemists. Veterinary practitioners who are not registered veterinary surgeons are precluded from prescribing drugs of the sulphonamide group.

THE Good Neighbour

BY MARY

From Me To You

DO roads fascinate you? I love them —the long roads stretching away to nothingness, without a bend in them, and the windy sort, perhaps tree-lined, that hide surprises at every bend. Roads have always appealed to me, and I have always loved exploring them. And who doesn't remember the fun that exploring used to be in our childhood days? Remember those days when hand in hand we wandered with our playmates up bushland tracks, wondering what we would find at the end of the path? It is not easy to recapture the rapture of those carefree, childhood days, especially in these trying times with the shadow of war hanging over our heads, but has it ever occurred to you that our journey through the days of life is all one long trip of exploration up an unknown road? Life is like a winding roadway—sometimes it winds up hills, and down again into the valleys, through days of summer sunshine, or nights of winter fog. But always it is the unknown that lies ahead of us that is beckoning us onwards. You may think you know what lies ahead of you, but you don't, really—every day brings a new turn in the roadway you are treading, and no two days are alike.

I recollect very clearly the words of Sir W. Mulock, Chief Justice of Ontario: "The testimony I bear is this: that the Castle of Enchantment is not yet behind me. It is before me still, and daily I catch glimpses of its battlements and towers. The rich spoils of memory are mine. Mine too are the precious things of today—books, flowers, pictures, nature and sport. The first day of May is still an enchanted day to me. The best thing of all is friends. The best of life is always further on. Its real lure is hidden from our eyes, somewhere beyond the hills of time."

You will agree with me that they are beautiful words, but perhaps it will come as a surprise to you to learn that the Chief Justice had reached his ninety-fifth birthday when he said: "The best of life is always further on." Inspiring words—keep remembering them when you are wondering if the best of life IS still ahead of you—so many of us are wondering along those lines today, but it doesn't do any good. Forget the past, and remember the future. It is the future we are living for today, a future which we must build up for our children, and we are not going to lay good foundations for tomorrow if we live in the past. Today is what makes tomorrow, and though tomorrow is hidden from you round the next bend of the road of your life, you can influence events by looking forward rather than looking back.

"Though the journey's end be silver,
The gold is in the going,
With the hurrying clouds above you,
And the hill-proud winds a-blowing,
And what's to see and hear beyond
The next bend there's no knowing."

Mary

Mary's "At Home"

I READ your "From Me to You" with interest, as I, too, have many keys, and I am really going to try your suggestion to take off half an hour a day for leisure. It seems hard to leave off when so much waits to be done, for with little children, and bigger ones, too, there seems to be always something that is not done, and as there is a shortage of farm labourers, I often have to go out and lend a hand with the sheep work and the cows. However, these days one is always glad to do one's bit, no matter what it is, if it is a help to the overburdened man on the farm.

Today is Good Friday, and what a beautiful day it is. It is very hard on days like this to realise that just a few hundred miles away from us people are in the midst of war, in the midst of death and suffering. I don't think that most of us are thankful enough that we have been spared so far in this great struggle. However, I am sure that if we all keep our shoulder to the wheel, things will come out right in the end.—**Shepherdess, South Canterbury.**

THE gales recently brought down a huge weeping willow that has stood for seventy years near our house, guarding it like a sentinel ever since it has been built. There it stood in all its beauty, for had not it achieved so much for withstanding the elements of the weather so long? No longer will the bees gather honey from its catkins; no longer will the birds take shelter in it, or build their nests. We mourn its passing because it meant so much to us, for three generations of our family have played beneath its shady boughs. Planted so long ago, by a pioneer's hand, it watched the progress of the years—hard toil, sorrow, happiness, and achievement. It brings to mind those lines by Joyce Kilmer:

"Poems are made by fools like me,
But only God can make a tree."

—Peggy, Pleasant Point.

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I AM just up again after having been laid up for a few days, but I am still under medical treatment, and possibly may have to undergo a slight operation, and all because I have been trying to keep up appearances. I would therefore dearly like to raise a small voice and say emphatically: "No, it does not pay in the long run." That is my personal experience, and I am now "paying the piper." When I was married six years ago, I felt so well and so happy, and I worked so hard to get our garden and home neat and tidy, that I did not heed Nature's warning, and did not lay down my tools when I felt tired. How much better it would have been had I done so. I would then have had a little time to read God's word, and to have improved my spiritual being, for these are the things that matter in the long run. Though we may have different beliefs, we nearly all believe in the hereafter. So now, though I believe in strict cleanliness of house and person, my advice to all is not to worry if the floor is not polished, but to have a little more time off for the contemplation of those things in life that really matter.—**A New Reader, Pleasant Point.**

MOST of all I like people, old people with their stories, middle-aged people with their ideas, and the young ones with their activity. To see any of the many members of the family, or to join with old friends, gives a happy calm. If perchance their ways are troublesome, there will be hours of planning their future, or justifying and explaining their actions. Day-dreaming is an antidote for the tedium of sweeping floors. Maybe it is a desire to have everyone's life lived happily ever after. With four children, and the oddments of work a farmer's wife finds to do beyond the strict confines of housework, any leisure has to be snatched. Gardening is perhaps the greatest safety valve I have; politics are a necessity; and books more important furnishings than the orthodox suites.—**Hay, Straw, and Donkey Feed, Kaukapakapa.**

I SUPPOSE you are wondering what I did with my prize-money? Well, the problem kept me guessing for quite a while. What could I do with it to help most? Make a soldier's parcel, buy something for my sick mother, or keep it as a birthday present for my husband—which was the best way? Suddenly a voice said: "Help the boys overseas—invest in National Savings." So that is where my prize-money has gone, into my National Savings account, where it will help most. One more atom towards attaining that victory which will one day be ours.—**Puckling, Wairarapa.**

I HAVE been very busy bottling peaches and pears, and now have a good stock of bottled fruit, also some sulphured apples. The latter was my first attempt. Tomorrow I hope to make tomato chutney. It's been terribly hot here lately; we could do with another good rain. The last came just in time for us, for our well was very low, and the pump was pumping air after milking each night.

We sold some super bags last week, and my husband gave me the odd money, so I bought a new hat—a green felt, with three jaunty feathers. I rarely wear a hat, but like to have one for emergencies, and I wore it to town yesterday, but several of my neighbours didn't recognise me, for they had never seen me in a hat before. I wonder if any of the Good Neighbours have had any inspirations in overcoming the shortage of elastic? I have a very little left now, and I am unable to buy any. Can anyone help with bright ideas?—**Plain Jane, Taupiri.**

A FRIEND of mine had an amusing one put across him on April the first this year. He works in an accountant's office, and when he arrived at work on the fateful morning, there was a note on his desk, requesting him to ring Mr. D. Body, telephone number so-and-so. He duly rang the number, but was told that it was the wrong number. He rang again, but received the same reply. At last, in desperation, he began to wonder if the message had been taken correctly, and so he questioned the office boy. The office boy grinned, and said: "Yes, that was the right number, all right. You have been ringing the morgue."—**Moi-Meme, Gore.**

UNKNOWN as we may be to one another, yet there is a kinship about these columns of ours, even though you may find me a dull dog, so to speak. The middle child of a large family I was too young to share in the pleasures of the elder members of the family, yet young enough to be the butt of much of their good-natured chaff and teasing; too old to share in the pleasures of the little sisters, yet old enough for them to come to me with their every difficulty, with confidence that they would be understood and helped. To them, under mother, I was their nursemaid, and as one of my little sisters, now grown big, laughingly said to me, "You were our walking encyclopaedia." Since I have married the years have passed quickly, and here again a book might be written, but it would contain much sadness—a spice of humour here and there, and stories of victories and defeats, disappointments and surprises. Suffice it to say that although for the last six years I have been virtually an invalid, I find myself not altogether useless, for although I cannot do very much, the boys like to come home and find me here, and now that I have recovered sufficiently not to have to lie in bed all the time, there are many little jobs that I can get done for their comfort.—**Old Lace and Lavender, Mata.**

ON going round among the people one hears a word being said so often that perhaps we do not realise how much we are all waiting for it to happen. "After." Yes, after is the word. Hear the people: "After the war is over"; "After, when the boy comes home"; "After the Germans are driven back"; a dozen afters. Surely this is the word that brings all our dreams nearer for a brighter future, with peace and happiness again ruling the world.—**M., Feilding.**

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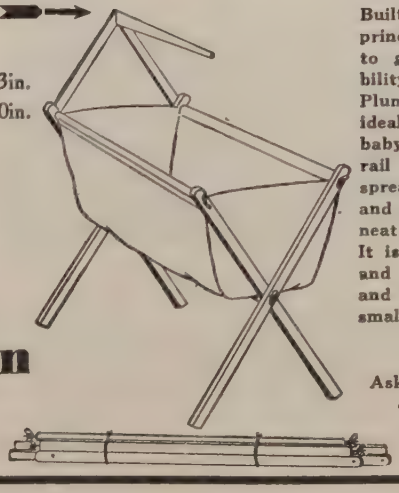

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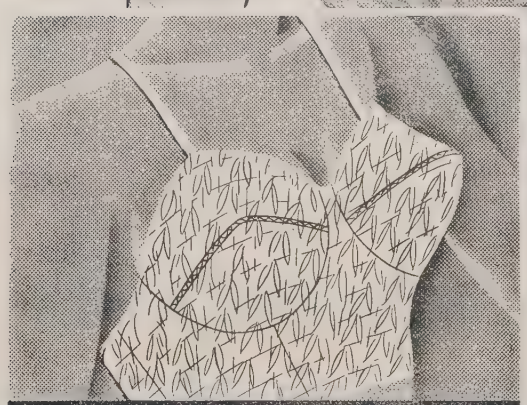

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The way you look affects even strangers you pass in the street. To them a woman's beauty stands for courage, serenity, a gallant heart . . . all the things we need so desperately just now.

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The Invitations Are Out

SO you have sent the invitations out, and now you are wondering just what you are going to do to entertain your guests, and to make your party go with a swing? Well, that's not going to be very difficult. There are so many good games to play that the evening will be over before you have realised that it has started.

The most important thing to see to when you are running a party is that all your guests know one another, and are feeling quite at home. Breaking the ice is always difficult, especially when some of your guests don't know the others, but there are ways of breaking the ice very successfully. Have you ever tried the Sweets Paper game? Everyone is given a toffee wrapped in paper—the toffee may be eaten, but the paper is to be torn into one straight length, without any breaks. It is amazing the lengths that can be torn from one single piece of lolly paper—at our last party the longest length was over four feet.

What about a black-out game, now that black-outs are the order of the day—or is it the night? Put a small table in the middle of the room, and place a lighted candle on the centre of it. Blindfold each of the guests in turn, and tell them they can have three blows at blowing out the candle. But after they have been blindfolded, make certain to turn them round three times, and then let them see how clever they can be! You'll be surprised at how few of them succeed in blowing the candle out.

A variation of musical chairs which is played with great amusement, especially when the players are men, is musical hats. The players sit in a circle on the floor, and have a hat less than the number of players. The music is played, and the player without a hat when the music stops goes out. Make sure to take a hat away each time a player goes out. This causes ever so much fun if you can produce some really old-fashioned hats.

What about "Rabbits"? The success of this game depends upon the solemnity of the ringleader. The players are told that they are going to play a game called rabbits, and are all asked to get down on their hands and knees, forming a circle. The leader must make very sure that a perfect circle is formed by the players stretching out their hands so that their little fingers are touching those of the next player. Now, when all is ready, and there is perfect quiet (this must be insisted upon) the leader says, "Now, you all know how to play rabbits, don't you?" The reply is invariably in the negative. "Well, neither do I," is the reply, but it must be quick, and it's not a bad plan to make for the door!

I played a grand game at a party the other night. It was a spelling test, and here is the sentence we were all told to spell: "Within the precincts of a cemetery a harassed cobbler and an embarrassed pedlar gauged with unparalleled ecstasy the symmetry of a lady's ankle." No one succeeded in spelling it all correctly!

Lots of fun can be had with pencil and paper games. The old favourite of "Consequences" is always fun, and we have a favourite we call "If I Had." The players are all given two slips of paper; on one piece they write a sentence beginning with "If I had," and on the other a sentence beginning "I would." For example, a player may write "If I had a million pounds" on the first slip, and "I would jump off the wharf and drown myself" on the other slip. The more ridiculous the phrases, the more fun is caused. Two hats are passed round, and all the "If I had's" go into one, and the "I would's" into the other. Shuffle the papers up well, and then pass the hats round again, letting each player choose one slip of paper from each hat. Reading them aloud invariably brings to light many fantastic ideas.

Written competitions always help to make a party go with a swing, and if any of you would like some of this type of competition, just drop me a line, and I will let you have some of the ones I have collected over the years.

And now for supper! Take your guests into a room where there is no light—it will probably mean leading them in one by one. Place on each chair a plate of good things to eat, and at a given signal, let them all eat in the dark for a few minutes. Then turn on the light, and get them to write down a list of what they have eaten! It is surprising how few remember just exactly what was what! Put a few unorthodox supper tasties on their plates just to fool them—try a piece of celery tucked into a piece of sausage, or a prune wrapped in bacon, even smoked fish with saveloy is tantalising when eaten in the dark!

What about a crocheted sweater? This one is ideal for wartime, for you can use up odds and ends of wool you may have, and your sweater will be the gayest ever. Rosemary Lane, the Columbia star of our picture, has a zip down the front of her sweater, and says it is ideal for sports wear.

Well, the invitations are out, and before long the party will be all over, and the guests will be going out into the night saying: "Thanks for the grand party—we have enjoyed ourselves!" And they will too, if you only remember one thing: the success of a party depends on keeping it going all the time. Have your programme arranged beforehand, and stick to it. Let one game follow on another without a moment's breathing space, and don't make the mistake of keeping the party going too long—send your guests home before they feel they have had enough, and they will all agree that your party was the best of the year.

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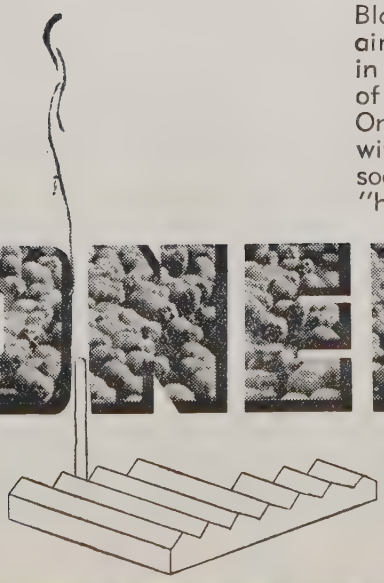

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Our Competition

MY DREAM KITCHEN

YOUR ideas on dream kitchens were all much the same—you all agreed on several points, such as plenty of light, and cupboards, and the necessary modern equipment, but only one of you mentioned the black cat on the hearth, which to my mind just makes a homely farm kitchen!

First prize to "Kowhai," Mangatainoka, and second to "Khorasbad," Marlborough, with "Rainbow," of North Canterbury, highly commended.

First Prize

FOREMOST must be the window. It must be very large, framing the matchless, ever-changing beauty of my mountain, and catching the sun almost the whole day. Next in importance comes the fireplace, plain brick, handsome, no draughty doors opening near it, beneath it a hot water service supplementary to the electric one. My fireplace must be large enough for the family all to sit round in armchairs, and for all to get a good share of heat.

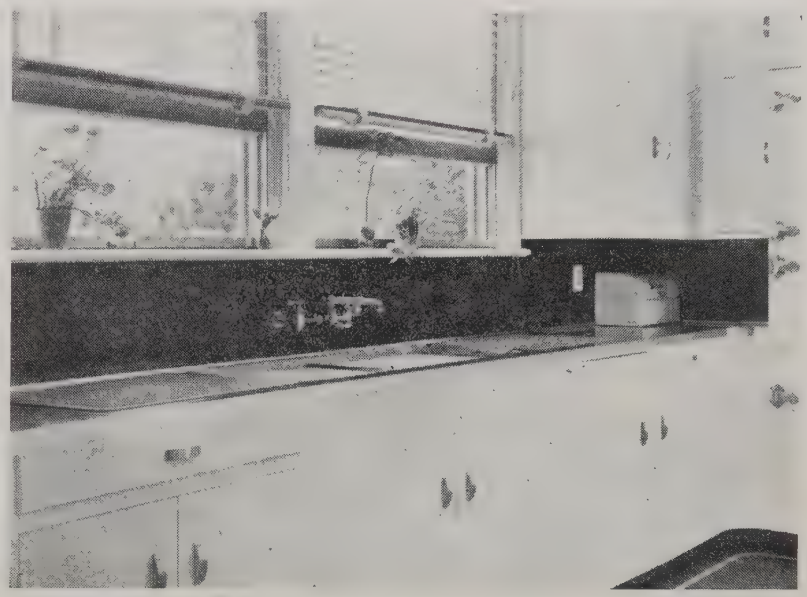
The kitchen will be supplemented by an alcove or kitchenette, neither too large, nor too small, painted a creamy gold, its efficient drawers and many cupboards chromium handled, the sink topped with tiles, its bubbling hot water service with shining tap, and its electric stove set in tiles. The telephone will dwell close to my hand in a glassed-in wall cupboard. I need not race round to the back door, for I can raise a wall slide opening into the porch, and so take in the wares of butcher, baker, and grocer.

The furniture will be plain and solid, fit to serve several generations; the floor will be covered with inlaid linoleum wood-grained, and large cosy orange and brown floor rugs. I want the room to be attractive enough for you, Mary, or any dainty city lady, to enjoy a meal in it, but not too grand for a wayfarer, in his working clothes, to step inside and have a cup of tea. The table will be substantial, and of a reasonable size, and at the head will sit a merry chap—you will see that by the twinkle in his eye, and the laughter lines about his eyes; and round my table there will be a merry band of boys and girls. The wide Morris couch, in a quiet corner, with its cushions and rug, will send out an invitation to take a nap in spare minutes.

This is my dream kitchen, and glad I am to say that the essential features such as the family, the sunshine, and the view, are in my real kitchen. Many of the architectural features are wrong, and short of pulling down the whole house they could not be altered; but, little by little, shilling by shilling, I am trying to make the dream into a reality, and though the goal is yet a long way off, it is a pleasure to strive for it.—**Kowhai, Mangatainoka.**

Second Prize

THE three foundations on which my dream kitchen is built are convenience, temperature, and light. You see, our present kitchen, though interesting as a genuine antique (it was built in the sixties), is lacking in these virtues. To reach the dining-room from the kitchen, one must negotiate a roofed causeway across the backyard, a flight of steps, three doors (invariably shut), and a passage. In my dream kitchen there would be a service hatch connecting direct with the dining-room; a bow window (don't be surprised, this is a dream kitchen!), and in the angle of the window a circular table for meals in cold weather. Of course, the incorporation of two tables, the meal table, and a large one, covered with coloured American cloth (no board scrubbing in my dream kitchen) means that the room itself must be a big one, and so it should be when it is the most-lived-in room in the house. Still with an eye to convenience, I would have my sink near the stove, and in front of a window, preferably one with a good view. My cupboards would be plentiful, and glassed in (we live in a flies' paradise), my linoleum one of the speckly kind that doesn't show the dirt too easily, and if I can't have cupboards in my kitchen, then I will have at least two dressers. As for my stove, perhaps



Dream kitchen? It seems to measure up to standard anyway, with plenty of light, and plenty of cupboards—it is the kitchen in the home of the Columbia star, Pat O'Brien.

Wartime Substitutes

"PLAIN JANE" has written in to ask if anyone has found a substitute for elastic, now it is unprocurable. And I know there are many other things that are now difficult to find in our shops, but remembering the old saying, "Necessity is the mother of invention," I am sure many of you have found ways of overcoming, to some extent at least, these shortages due to the war. Let us share your ideas.

"MY WARTIME SUBSTITUTES."

First prize of 10/- to the best entry received by June 20th, and a second prize of 5/-.

Send your entries to—

"MARY,"
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P.O. Box 3004,
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the most important of all kitchen fixtures, it would be a wood range with two ovens. The extra cleaning is well repaid by the comfort in winter. As an auxiliary for hot evenings in summer when one doesn't want to light the range, I would have an electric hotplate, and an electric jug. For lighting, my fancy is for a good globe over the sink and stove, and another in the centre of the ceiling. And I mustn't forget to add at least two easy chairs, a radio, and, last, but not least, a black cat on the hearth.—**Khorasbad, Marlborough.**

Highly Commended

AS the kitchen is my workroom, it must be convenient and comfortable, as well as pleasing to the eye, so I build it next to the living-room, and make it large enough to move round in, but small enough to keep clean. On one side there is an old-fashioned couch, where I can sit with my feet up, and shell the peas, or lie for a few moments, relaxed and at ease, when the opportunity offers. The electric light is almost above the electric stove—not in the centre of the ceiling; and the stove has a hot-box so that I don't crack the plates warming them in the oven. The stay-bright taps for the hot and cold water service shine over a blue enamel sink, set in a wide blue tiled bench, which tones with the gay blue curtains, spotted with white, which hang from a small pelmet, edged with white braid. There are cupboards everywhere, and one in particular above the sink bench, contains blue enamel saucepans made in Sweden, but unprocurable now—they do not chip, neither do they burn easily. And so I won't have to dive down into the dark regions for my saucepans any more. The table is near the stove, the bench, and the cupboards, the scales, baking powder, flour, sugar, and bread bins, so that cooking is a delight. The chairs, and the legs of the table are enamelled in blue, but the surface I keep scrubbed white, and I often put a little cloth on it so that himself and myself may have a quick cup of tea there.

The view from the window is always refreshing, and when it rains I just reverse, and there, on the small shelf which holds my clock, I shall see my indoor hyacinth giving promise of a beautiful blue bloom to come. And in the summer, when those annoying blowflies boom through the air, I shall have a flyproof door and window protectors, so they will not be able to enter my domain. The inlaid lino is patterned so that it doesn't tell many tales, and there is a beautiful patterned rag mat near the door. And if sometimes I am bending over a saucepan stirring toffee for a little girl and boy, my kitchen will be my dream come true.—**Rainbow, North Canterbury.**

MY DREAM KITCHEN.

I like to keep my little kitchen wall
As fair as any bright-hung banquet hall;
And make the kitchen table service shine
As if a passing king might come and dine.

No squire most zealous of his master's state
Polished his armour as I do my grate.
I dress the window curtains that they be
Fit for the fairest lady's eye to see.

Brasses and glasses on the little shelf—
No one can keep them as I do myself.
The cosy cleanness of the kitchen floor
Gladdens the eyes of those who seek my door.

I need not fear, at any time of day,
What unexpected guests might think or say,
But when I hear the knocker's merry din,
Say without hesitation, "Welcome in."

. . . How Does Your Garden Grow?

NOT very much spare time for your garden these days, is there? Winter is setting in very rapidly, and hours of daylight are becoming shorter. But keen gardeners will always manage to find time to do those things which are essential to the upkeep of the garden, and this month Mr. Hyde gives you good advice on the art of pruning.—MARY.

SOME of the most attractive features of a farm homestead are a well-drained situation and a good selection of trees and shrubs well placed and well grown. A well-grown natural object of any kind is attractive and a fitting subject for contemplation, but it specally applies to trees and shrubs of the class mentioned. Attention has already been drawn in these notes to the present opportunity for correcting mistakes in plant arrangement. Errors in selection can also now be rectified; and of the factors which contribute to a well-grown tree, pruning—next to selection and situation—is probably most important.

Pruning is an art acquired by practice; but to be successful the amateur should keep a few of the main fundamental principles clearly in view. (1) When planting out young trees and shrubs, and annually for a few years afterwards, each plant should be thoughtfully pruned with a view to strong, well-balanced growth of the main limbs. (2) Mature trees and shrubs are examined at this season and pruned when necessary to remove dead wood and relieve congestion and to admit light and air necessary for healthy growth. (3) Heavily flowering hybrids such as roses, hydrangeas, etc., are regularly pruned annually to produce in moderate quantity and best condition the class of wood which carries a good bloom—plants of this class also require generous feeding. (4) A major operation to old trees is sometimes necessary after storm damage, or when electric wiring is done in their vicinity. In all cases cutting should be done in a cleanly manner with sharp tools, and the larger wounds dressed with a water-proof coating of bitumen emulsion or lead paint, etc., which should be renewed annually as required. In most instances a limb should be removed completely, making the cut flush with the surface from which it arises, or the cut should be made just above a sound bud or healthy side growth.

Plant selection has to do with outstanding suitability for flourishing under the local conditions of soil and climate, and fulfilling the duty expected of it. Situation has to do with its exact position, in which it must harmonise with the general planting scheme and fulfil its duty without overgrowing its neighbours or obstructing traffic or services—such as electric wires, etc.

Most of the trees and shrubs listed in our nursery catalogues may be grown in all parts of the country; but the discriminating planter will choose those which naturally excel in the soil and climate of his particular locality. Those around the coast and in

What To Do During May

Give attention to pruning and the removal of trees and plants causing obstruction or unattractive owing to age, disease or unsuitability.

Carry on with the laying out of new gardens, and alterations and additions to old ones.

Carefully select trees and shrubs for planting out, having in mind the purpose in view and their suitability for the environment.

northern districts are usually warmer, and the more tender plants may be grown with success. Western districts have a greater rainfall, which naturally suits hardwood plant growth generally, as can be seen by the native bush found in such localities. Volcanic soils cover large areas, and of the remainder they may be somewhat light and stoney, or heavy. There are exotic plants with a preference for each of these characteristics, in the same manner as that of our native plants. In the same way one must learn them by observation and taking note of those that flourish under each condition, more especially that in which one is particularly interested. In this way a higher standard of excellence is easily attained in both variety and quality.

In the warmer humid localities, especially on volcanic soils and good loams, one is impressed by the large specimens of tree ferns (*cyathea*), palms, and vigorous native growth of the more tender kinds, including puriri, meryta, and pohutukawa. Also outstanding are rhododendrons, and azaleas, evergreen and deciduous. Camellia hybrids and species; the fragrant *Brugmansia*, hibiscus varieties, *Jacaranda mimosaefolia, Justicia carnea, Plumbago capensis, Tibauchina* species, *Luculia gratissima*, and even the poinsettias with their scarlet bracts. Conspicuous among climbers in such a locality are the small-leaved fig *Ficus minima. Solanum Wenlandii, Lapageria, Tecomas*, and *Bomarias.* Herbaceous plants flourishing under these sub-tropical conditions are *Bouvardia, Strelitzia reginae, Monstera deliciosa*, the fragrant "cradle lily" *Xanthosoma*, and the "ginger lily" *Hedychium Gardnerianum.* In localities that are warm but somewhat drier species of cypress are conspicuous; Bougainvillea is a favourite climber, together with species of Bignonia. Trees include "crimson gum" *Eucalyptus ficifolia*, and winter flowering "pink gum," *E. leucoxylon* of moderate height are very popular; as also are the spring flowering wattles, species of acacia. Roses and carnations are at their best, also varieties of oleander. When plants such as these are made a definite feature, gardens in these localities have an interest and character which many lack at present. Plant associations suitable for gardens in the cooler districts will be dealt with later.

—*WM. C. HYDE, Horticulturist, Wellington.*

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Mary's Mixing Bowl

Eggless Cakes

THE prize of 2s. 6d. for the best eggless cake recipe is awarded to "Plain Jane," Taupiri, for the following entry:—

EGGLESS WALNUT CAKE.

½ lb. butter, ½ lb. sugar, 2 large cups flour, ½ lb. walnuts, ½ lb. dates, 2 teaspoons bicarbonate soda, 2 teaspoons vinegar, 1 teaspoon baking powder, 1 large cup milk, 1 tablespoon cocoa, 1 dessert spoon golden syrup.

Cream butter and sugar, add milk, syrup, and bi-carb. Sift in flour, cocoa, baking powder. Add walnuts and dates (less of these can be used; I use half quantity). Lastly add vinegar and vanilla. Bake in a large tin 1-1¼ hours.—**"Plain Jane," Taupiri.**

GINGERBREAD.

1 cup sugar, ½ cup butter, 1 cup treacle, 1 cup sour milk, 1 tablespoon ground ginger, 1 teaspoon cinnamon, 1 teaspoon soda, 4 cups flour (about).

Warm the treacle, butter, and sugar, and mix well, then add sour milk. Stir and then add flour and the soda dissolved in hot water last and mix well. Bake in a good oven.—**"J.F.," Epsom.**

BUTTER KISSES.

½ lb. butter, ½ teacup milk, 3 oz. icing sugar, 2 cups flour, 1 heaped teaspoon baking powder, 1 oz. vanilla custard powder.

Cream butter and sugar, add milk, beat well. Then add flour and baking powder previously sifted together. Crop on greased tray and bake in moderate oven (350 deg. F.) about ¼ hour. When cold put together with butter icing.—**"J.McN.," Waimauku.**

EGGLESS CHOCOLATE CAKE.

¼ lb. butter, 2 cups flour, 2 teas. baking powder, 1 teas. baking soda, ¾ cup sugar, 2 level tablespoons golden syrup, 1 heaped tablespoon cocoa, 1 cup milk.

Mix flour, sugar, and baking powder together in mixing bowl. Mix cocoa with ½ cup milk. Put golden syrup and butter in a pot and put on stove to melt. When melted add baking soda dissolved in ½ cup milk and cocoa.

Your Best Recipe

A CASH prize of 2/6 is awarded each month to the best recipe sent to the "Mixing Bowl." Entries for this month's competition close on June 20th, 1942.

Stir into flour, etc., and have mixture stiff. Bake in moderate oven for about ½ hour.—**"P.H.," Piriaka.**

EGGLESS CAKE.

1 cup butter, 1 lb. mixed fruit, 1 cup sugar, 1 cup golden syrup, 1 cup milk, 4 cups flour, 1 teaspoon soda, 1 teaspoon nutmeg, 1 teaspoon cinnamon.

Cream butter and sugar. Warm golden syrup in milk and add with flour in which cinnamon, nutmeg, and soda have been mixed. Beat well and add fruit. Bake 3 hours in slow oven. This recipe improves with keeping.—**"Gee Bee," Kati Kati.**

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EGGLESS SPONGE SANDWICH.

Blend together 1 tablespoon butter and ½ cup sugar; dissolve ½ teaspoon of carb. soda in ½ cup of milk and water and 1 large tablespoon golden syrup; beat well together and stir in 1 large cup of flour, 1 teaspoon each of baking powder, ground ginger, and cinnamon. Bake in sandwich tins 15 to 20 minutes.—**"Matilda," Te Puke.**

WELSH BUN LOAF.

3½ lb. flour, 1 lb. butter, ½ lb. lard, 1½ lb. sugar, 1½ lb. sultanas, 1½ lb. currants, 1 packet raisins, 4 eggs, 1 candied peel, 2 oz. cherries, 2 oz. baking powder, a little milk.

The above ingredients will make four to five loaf-shaped cakes, according to the size of the tins. Prepare the ingredients on the general lines for a cake. Cream the butter and sugar together, add the eggs, then the flour, with the baking powder gradually. Add all the other ingredients gradually, make it fairly moist with milk, then bake for three hours in a moderate to fairly hot oven.

RAISIN AND RHUBARB PIE.

4 cupfuls fresh rhubarb, sliced, 1 cupful seeded raisins, about 1 cupful sugar, 1 tablespoon quick-cooking tapioca, pastry.

Roll out half the pastry dough one-eighth of an inch thick and about 2 inches larger than the pie pan. Fit into the piedish and trim the crust even with its edge. Add rhubarb, raisins, tapioca, sugar, which have been mixed together. Roll out top crust, folding edges over lower crust. Bake in a hot oven for thirty minutes.

STUFFED CHOPS.

6 chops, 6 mushrooms (peeled), 1 tablespoon butter, 1 dessertspoon chopped parsley, 1 teaspoon lemon juice, 1 dessertspoon butter.

Bone the chops, tuck a mushroom at the long end of each, wrap end round to form a flat circle, and skewer in place. Brush with 1 tablespoon melted butter, and grill three minutes on each side quickly, then reduce heat and cook slowly till done. Take out skewers, dust with salt and pepper, mix parsley, lemon juice, and butter together, put a pat on top of each chop. Serve hot with potato salad.

PORK AND ONION PUDDING.

1½ lb. flap of pork, 1 large onion, 1 large potato, pepper, salt, 1 teaspoon Worcestershire sauce.

Dice the meat, put a layer in a basin, add layer of onion (sliced), then a layer of potato and add pepper and salt, until basin is nearly full. Half fill basin with water flavoured with sauce, cover with suet crust, and steam 4 hours. Liquid may be thickened before serving. Serves six.

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SUBSCRIPTION RATES.

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PORRIDGE FRITTERS.

½ cup cooked oatmeal porridge, 1 cup plain flour, 1 teaspoon baking powder, 1 egg, milk.

Sift flour and baking powder, and add to porridge beaten egg and milk enough to make of batter consistency. Drop in spoonfuls into boiling fat, and brown nicely on both sides. Serve with bacon for breakfast.

LITTLE APPLE CAKES.

Cream 2 tablespoons butter with 1 tablespoon sugar, and 1 tablespoon sweet cream. Beat in 1 egg, and mix in 1 heaped cup of flour, sifted with 1 tablespoon cornflour, and 1 teaspoon baking powder. Roll out, and cut into rounds; line patty tins with half-rounds, fill with stewed apple pulp, cover with remaining rounds, and bake in moderate oven till light brown. Serve with whipped cream.

BANANA SPONGE ROLY-POLY.

Beat 1 tablespoon butter and 2 tablespoons sugar to a cream, add 1 well-beaten egg, and 1 heaped cup of self-raising flour. Put 1 cup of milk in pie-dish, and stand in oven to heat. Then knead pastry on floured board, roll out, spread with mashed bananas, roll up, and put into boiling milk. Bake for 20 minutes—by that time all the milk should be absorbed, and the pudding light and well browned. Serve with golden syrup.

POTTED VEAL AND BACON.

Cut equal quantities of thinly-sliced veal and bacon, put a layer in a casserole, sprinkle with powdered herbs, a little horse-radish, and salt. Over all sprinkle lemon juice, and grated rind of one lemon, cover tightly, and cook for two to three hours. Remove from oven, drain off gravy, pour a little ketchup over, and press down with a heavy weight. When set, seal in a pot until required. Keeps well.

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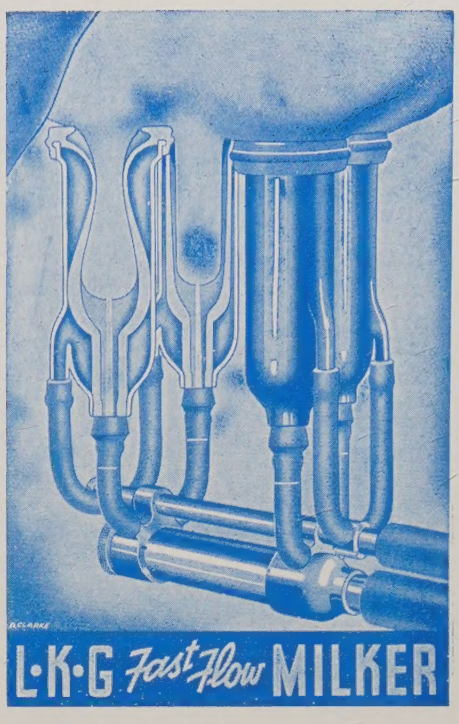

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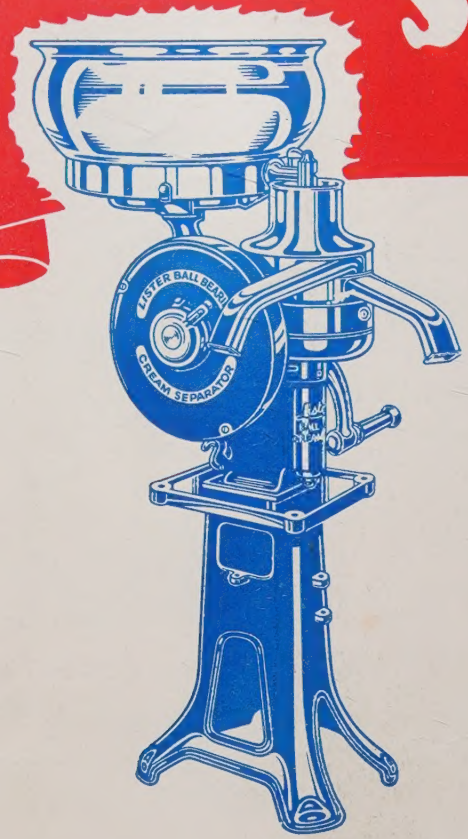

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